

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.





3 THE KILN DRYING OF PREVIOUSLY AIR-DRIED VIOLA (DIALYANTHERA SPP.)

By

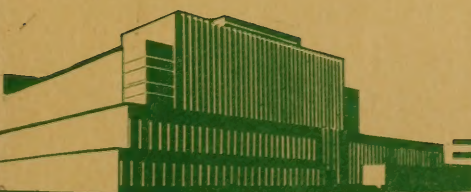
I.  
LLEWELYN WILLIAMS, Research Associate

U. S. DEPT. OF AGRICULTURE  
NATIONAL AGRICULTURAL LIBRARY  
JUN 10 1964  
C & R-PREP.

8  
LIMITED DISTRIBUTION COPY  
NOT FOR PUBLICATION //



APPROVED  
COPY FILED  
FEB 26 1962  
LIBRARIAN



FOREST PRODUCTS LABORATORY  
MADISON, WISCONSIN

UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE

In Cooperation with the University of Wisconsin

University, WI





THE KILN DRYING OF PREVIOUSLY AIR-DRIED VIROLA (DIALYANTHERA SPP.)

wavy panels; so the ultimate goal was not attained. Brown-streaked virola should not be used for hot-press panel core stock, preference

By LLEWELYN WILLIAMS, Research Associate

Introduction,  
Forest Products Laboratory,<sup>1</sup> Forest Service  
U.S. Department of Agriculture

This report covers research<sup>2</sup> on the kiln drying of the so-called

Source  
virola from southwestern Colombia. The lumber, specially selected for  
This material originated in the Tumaco region, on the Pacific Coast  
its brown-streak material, was furnished by the Far Islands Timber Company,  
of southwestern Colombia. The Abstract  
Los Angeles, Calif.,<sup>3</sup> with the cooperation of the Pacific Southwest

Fore Brownheart portions of Colombian virola (*Dialyanthera* spp.) have  
for core stock sometimes collapse and produce wavy-surfaced hot-pressed  
panels. To determine whether air-dried wood of this type could be kiln

dried successfully to a uniform moisture content without collapse and

Species  
honeycomb, three kiln runs were made. The ultimate goal was to avoid  
distortion during hot pressing by precision drying the material.

Problem  
with a hand lens indicated it was a species of *Dialyanthera*, of the  
This research indicated that, by using a mild schedule and by assum-  
ing an artificially high kiln sample moisture content for pieces with wet  
zones, such stock can be kiln dried without collapse, excessive shrinkage,  
material (leaves, flowers, and/or fruit), it is impossible to identify  
or honeycomb to a uniform moisture content, free of stress. The best  
results were obtained using a modified U.S. Forest Products Laboratory

hardwood kiln schedule T5-C3. The elapsed time was 6-3/4 days, including  
collapse often occurs in the brown streaks. Honeycombing frequently  
equalizing and conditioning. Since the material was limited, the results  
should not be regarded as final and conclusive. *Virola* is the botanical

name for another distinct genus of the same plant family, represented by  
Maintained at Madison, Wis., in cooperation with the University of  
Wisconsin.

<sup>2</sup>Under the supervision of Mr. J. M. McMillan, Technologist. The streaky

<sup>3</sup>Correspondence, Far Island Timber Company, May 11 and June 2, 1959.

<sup>4</sup>B. Francis Kukachka, Division of Timber Growth and Utilization Relations.



by

LAWRELYN WILLIAMS, Research Associate  
Forest Products Laboratory,<sup>1</sup> Forest Service  
U.S. Department of Agriculture

Abstract

Brownheart portions of Colombian virgias (*Dialyanthera* spp.) used for core stock sometimes collapse and produce wavy-surfaced not-pressed panels. To determine whether air-dried wood of this type could be kiln dried successfully to a uniform moisture content without collapse and honeycomb, three kiln runs were made. The ultimate goal was to avoid distortion during hot pressing by pre-drying the material. This research indicated that, by using a mild schedule and by assuming an artificially high kiln sample moisture content for pieces with wet zones, such stock can be kiln dried without collapse, excessive shrinkage, or honeycomb to a uniform moisture content, free of stress. The best results were obtained using a modified U.S. Forest Products Laboratory hardwood kiln schedule TS-C3. The elapsed time was 6-3/4 days, including equalizing and conditioning. Since the material was limited, the results should not be regarded as final and conclusive.

<sup>1</sup>Maintained at Madison, Wis., in cooperation with the University of Wisconsin.



Subsequent hot-pressing trials with some of the stock produced wavy panels, so the ultimate goal was not attained. Brown-streaked *virola* should not be used for hot-press panel core stock; preference should be given to the use of the local name "cuangare," rather than "virola."

### Introduction

This report covers research<sup>2</sup> on the kiln drying of the so-called

#### Source

*virola* from southwestern Colombia. The lumber, specially selected for this material originated in the Tumaco region, on the Pacific Coast of southwestern Colombia.<sup>3</sup> This is a low-lying, humid area with a Los Angeles, Calif.,<sup>3</sup> with the cooperation of the Pacific Southwest high annual precipitation, and the vegetation is of the dense rain or Forest and Range Experiment Station, Berkeley, Calif. It was shipped by motor freight from Morehead City, N.C., arriving at the Laboratory scattered and mixed with many other types of trees. An aerial picture May 17, 1959.

of the mill indicates that the logs are stored on tidal flats, subject to

#### Species

Although shipped under the name *virola*, examination of the wood

#### Problem

with a hand lens<sup>4</sup> indicated it was a species of *Dialyanthera*, of the

This wood is now being used on an increasing scale for core stock. Nutmeg Family (*Myristicaceae*). It is known in the Pacific Coast area

In some shipments, a type of wood known as brown heart has been present of Colombia as "cuangare." In the absence of corresponding herbarium

in a portion of the stock. When cores made by edge-gluing such brown-material (leaves, flowers, and/or fruit), it is impossible to identify

heart stock are hot-pressed with crossbands and face plys into conven-the precise species. More than one species of *Dialyanthera* may have

tional plywood panels, wavy panels have sometimes resulted. Also, been represented in this shipment.

collapse often occurs in the brown streaks. Honeycombing frequently

Although the name "virola" is now frequently applied to this wood accompanies the collapse.

in the trade, it is somewhat a misnomer, since *Virola* is the botanical

As received, the experimental material had some dark streaks on name for another distinct genus of the same plant family, represented by the surface, and freshly cut cross sections showed fairly large areas of

<sup>2</sup>Under the supervision of Mr. J. M. McMillen, Technologist. if the streaky

<sup>3</sup>Correspondence, Far Island Timber Company, May 11 and June 2, 1959.

<sup>4</sup>B. Francis Kukachka, Division of Timber Growth and Utilization Relations.



Subsequent hot-pressing trials with some of the stock produced

wavy panels, so the ultimate goal was not attained. Brown-streaked

viola should not be used for hot-press panel core stock.

### Introduction

This report covers research<sup>1</sup> on the kiln drying of the so-called

viola from southwestern Colombia. The lumber, specially selected for

its brown-streak material, was furnished by the Far Islands Timber Company,

Los Angeles, Calif.,<sup>2</sup> with the cooperation of the Pacific Southwest

Forest and Range Experiment Station, Berkeley, Calif. It was shipped

by motor freight from Morehead City, N.C., arriving at the Laboratory

May 17, 1929.

### Species

Although shipped under the name *viola*, examination of the wood

with a hand lens<sup>3</sup> indicated it was a species of *Dialyanthera*, of the

Myrtaceae family (*Myrtaceae*). It is known in the Pacific Coast area

of Colombia as "cunagata". In the absence of corresponding herbarium

material (leaves, flowers, and/or fruit), it is impossible to identify

the precise species. More than one species of *Dialyanthera* may have

been represented in this shipment.

Although the name "*viola*" is now frequently applied to this wood

in the trade, it is somewhat a misnomer, since *Viola* is the botanical

name for another distinct genus of the same plant family, represented by

<sup>1</sup>Under the supervision of Mr. J. M. McMillan, Technologist.

<sup>2</sup>Correspondence, Far Island Timber Company, May 11 and June 2, 1929.

<sup>3</sup>B. Francis Kuchaka, Division of Timber Growth and Utilization Relations.



several species in northern South America. The use of "virola" for a species of Dialyanthera is like calling hickory a walnut, since both belong to the same family. In this respect, therefore, preference should be given to the use of the local name "cuangare," rather than "virola."

### Source

This material originated in the Tumaco region, on the Pacific Coast of southwestern Colombia.<sup>3</sup> This is a low-lying, humid area with a high annual precipitation, and the vegetation is of the dense rain or evergreen-forest type. As in other tropical forests, the species is scattered and mixed with many other types of trees. An aerial picture of the mill indicates that the logs are stored on tidal flats, subject to alternate wetting and drying.

### Problem

This wood is now being used on an increasing scale for core stock. The drying study are given separately by kiln runs. A brief discussion

In some shipments, a type of wood known as brown heart has been present

in a portion of the stock. When cores made by edge-gluing such brown-heart stock are hot-pressed with crossbands and face plys into conventional plywood panels, wavy panels have sometimes resulted. Also, collapse often occurs in the brown streaks. Honeycombing frequently accompanies the collapse.

As received, the experimental material had some dark streaks on the surface, and freshly cut cross sections showed fairly large areas of very wet wood. The problem in this experiment was to see if the streaky



several species in northern South America. The use of "Viola" for a species of *Disanthus* is like calling hickory a walnut, since both belong to the same family. In this respect, therefore, preference should be given to the use of the local name "cunagata," rather than "Viola."

#### Source

This material originated in the Tamaso region, on the Pacific Coast of southwestern Colombia. This is a low-lying, humid area with a high annual precipitation, and the vegetation is of the dense rain or evergreen-forest type. As in other tropical forests, the species is scattered and mixed with many other types of trees. An aerial picture of the mill indicates that the logs are stored on tidal flats, subject to alternate wetting and drying.

#### Problem

This wood is now being used on an increasing scale for core stock. In some shipments, a type of wood known as brown heart has been present in a portion of the stock. When cores made by edge-gluing such brown-heart stock are hot-pressed with crossbands and face plys into conventional plywood panels, wavy panels have sometimes resulted. Also,

collapse often occurs in the brown streaks. Honeycombing frequently accompanies the collapse. As received, the experimental material had some dark streaks on the surface, and freshly cut cross sections showed fairly large areas of very wet wood. The problem in this experiment was to see if the streaky



and wet material could be easily kiln dried to a uniform moisture content without collapsing or honeycombing in the process.

Subsequent to completion of the drying, it was the job of another division of the Laboratory to determine if the carefully dried stock could be satisfactorily hot-pressed into panels. It had been previously air-dried in Columbia. Immediately upon arrival at the Laboratory for tests

To determine a satisfactory kiln drying procedure, the material was divided into three batches for (1) an exploratory kiln run using a schedule recommended for mahogany, (2) a pilot test with a schedule modified on the basis of results from run 1, and (3) a kiln run using a time schedule. The presence of interior wet streaks required development of an artificial method of assigning kiln sample moisture content values. The general plan was to dry all the wood to an average of 3 percent moisture content, with 7 percent as minimum and 5 percent as maximum.

The schedules, drying procedures, and analyses of the results for the drying study are given separately by kiln runs. A brief discussion of the study then follows. Although not a part of this experiment, the results of the hot-pressed pressing of solid-core plywood from the material are discussed to round out the consideration of the suitability of the brown-streak stock for such a use.

Joseph J. Clark, Biologist, Division of Forest Products, U.S. Forest Service, Washington, D.C.

The first section of the report is devoted to a general survey of the work done during the year. It is followed by a detailed account of the various projects undertaken, and a summary of the results obtained. The report concludes with a list of references and a statement of the author's acknowledgments.

The following table gives a summary of the work done during the year. It is divided into three main sections: (1) General Survey, (2) Detailed Account of Projects, and (3) Summary of Results. The first section is devoted to a general survey of the work done during the year. It is followed by a detailed account of the various projects undertaken, and a summary of the results obtained. The report concludes with a list of references and a statement of the author's acknowledgments.

It is to be noted that the work done during the year has been of a very general nature. It is hoped that the results obtained will be of use to other workers in the field. The author wishes to express his appreciation to the many friends and colleagues who have assisted him in his work.

The author wishes to express his appreciation to the many friends and colleagues who have assisted him in his work. The report concludes with a list of references and a statement of the author's acknowledgments.



which were present in Material and General Procedure

### Material

The shipment consisted of about 100 board feet of 1- by 3- to 4-inch by 4- to 6-foot rough lumber of average quality. It had been previously air-dried in Indonesia. Immediately upon arrival at the laboratory the material was examined. Some of the boards had dark streaks on the outside as well as in the interior. The interior dark areas did not necessarily coincide with the surface streaks nor with the interior zones of very high moisture. By mere superficial examination it could not be readily determined whether these irregular darker zones were indicative of a higher moisture concentration, caused by heartrot (decay) fungi, or a chemical discoloration. Some consideration was also given that these streaks formed part of the heartwood, although usually in the woods of this group the line of demarcation between the heartwood and sapwood is not well defined. Furthermore, there is no information at what stage these streaks appear--whether in the standing tree, in the logs near the stump, during transport between the forest and the mill, as the result of improper or insufficient air drying, or during storing and shipment of the air-dried lumber.

Subsequent to the start of the kiln drying, some stained "brownheart" specimens were microscopically examined<sup>5</sup> to determine whether or not fungi were associated with the discoloration. In all brown discolored areas, including one stained sapwood area as well as the stained heartwood, fungus

The kiln material was stained with a mixture of aluminum powder

<sup>5</sup> Joseph M. Clark, Pathologist, Division of Food Preservation.





on the assembled material, marked "A" were immediately hyphae were present and abundant. The observed hyphae appeared to be for "B" samples and most of the remainder of the material were those of decay fungi predominantly rather than stain fungi, but no cultures could grow at 50% and 62 percent relative humidity. In this case for positive determinations were made.

They were covered with a damp cloth.

### Specific Gravity

Moisture Content Determination:  
The specific gravity was determined<sup>4</sup> on 10 samples cut soon after arrival of the material. All the sections, including the wet and dry zones of the distribution sections, were weighed immediately on being cut. Their volume, specific gravity ranged from 0.36 to 0.41, with an average of 0.39. They were then dried for 24 hours, after which period they were reweighed. Specific gravity of 31 previous samples of this wood, on the same basis, gave their moisture content. In view of the fact that four moisture sections also averaged 0.39.

Two sections from each board and one section was subdivided into wet and dry

### Kiln Samples and Moisture Sections - test values. The results applicable

Ten boards that appeared to be the wettest and with dark streaks prevalent were selected and cut to furnish two equal sets of kiln samples about 23 inches long--one-half marked "A" and the other half "B." At this stage, also, a series of moisture sections, 1 inch thick sawn crosswise through the board, were cut. Three sections were obtained from the middle of each board; one to determine the specific gravity; a second marked "1a middle," "2a middle," etc., to determine the average moisture content; a third distribution section cut to provide a small zone which appeared to be the wettest as well as two dry end zones. Additional average moisture content sections were cut about 10 inches from each end of the "A" and "B" halves, marked "1a end," "2a end," etc., and "1b end," "2b end," etc. The wettest zone had a moisture content of 81 percent, while the The kiln samples were end-coated with a mixture of aluminum powder and phenolic resin varnish and weighed. The kiln samples and about one-third





of the unsampled material, marked "A," were immediately started in Run 1. The "B" samples and most of the remainder of the segment were stored in a cold room at 35° F. and 67 percent relative humidity. In this room they were covered with a damp cloth.

#### Moisture Content Determination

All the moisture sections, including the wet and dry zones of the distribution sections, were weighed immediately on being cut. They were oven-dried for 24 hours, after which period they were reweighed to determine their moisture content. In view of the fact that four moisture sections were taken from each board and one section was subdivided into wet and dry zones, there were five moisture-content values. The results applicable to the "A" samples are shown in table I. For the moisture distribution sections, an unweighted average of the wet- and dry-zone moisture percentages for each sample is shown.

Taking into consideration the specific gravity of the samples (average 0.38), the general appearance, and the reported permeability as well as value. In most cases this was either the moisture content of the middle section or the average of the dry and wet zones, whichever was higher. The arbitrarily selected high moisture content was then used to determine the calculated oven-dry weight for the kiln sample. This weight, in turn, was used to calculate the moisture content of the sample during the first part of the drying run.

It should be indicated that, of the moisture sections at the initial stage, the wettest zone had a moisture content of 31 percent, while the driest section was 17.4 percent, indicating a wide range of moisture content

of the unexposed material, and the "A" was immediately exposed in the  
The "B" samples and most of the remainder of the samples were stored in  
a cold room at 35° F. and 85 percent relative humidity. In this case  
they were covered with a damp cloth.

#### Moisture Content Determination

All the moisture samples, including the wet and dry samples at the  
drying station, were weighed immediately on being wet. They were  
then placed in a desiccator over  $\text{CaCl}_2$  for 24 hours. After 24 hours they were weighed in  
the desiccator. In view of the fact that the moisture content  
was found that the wet and dry samples were weighed in the wet

state, these were five moisture-content values. The results applicable

to the "B" samples are shown in Table 1. The five moisture determinations

were, on an average, of the wet and dry samples were 1.2, 1.3, 1.4, 1.5, and 1.6

percent. The average of these five values is 1.4 percent.

The results of the moisture content determinations are shown in Table 1.

It was found that the moisture content of the samples

was not significantly different from the moisture content of the samples.

The relatively small difference between the moisture content of the samples

and the moisture content of the samples was due to the fact that the samples

were not completely dry at the time of weighing. This weight, however,

was not significantly different from the moisture content of the samples.

It should be pointed out that the moisture content of the samples

was not significantly different from the moisture content of the samples.

The results of the moisture content determinations are shown in Table 1.

The results of the moisture content determinations are shown in Table 1.



and nonuniform air drying. On the basis of the arbitrary moisture content values used, the moisture content of the kiln samples in run 1 ranged from 25.0 to 64 percent.

#### Kiln Equipment and Piling Method

The three runs were carried out in a small experimental unit. It is equipped with two reversible fans and automatic control of vents and both dry- and wet-bulb temperatures. The load width was 4 feet. In the three kiln runs, the material was flat piled, lengthwise of the kiln, on 3/4- by 1-1/4-inch stickers. Sticker spacing ranged from 18 to 24 inches. Canvas baffles were dropped from the fan floor to the top of the load to prevent bypassing of any circulating air.

#### Kiln Schedule

Taking into consideration the specific gravity of the species (average 0.39), its general appearance, and the reported susceptibility to collapse and honeycombing near the "brownheart," a mild drying schedule was indicated for the initial run. From "Schedules for the Kiln Drying of Wood," Forest Products Laboratory Report No. 1791, the basic mahogany schedule T6-C4 was selected and modified as follows:

The run started at 2 p.m., May 19, 1959, with an initial dry-bulb temperature of 70° F. and a wet-bulb depression of 7° F. Changes in temperature and humidity were generally made on the basis of the average moisture content of the material, and at intervals using values derived from the constantly changing values. As drying progressed, it was considered desirable to increase the dry-bulb temperature and decrease the wet-bulb depression.

and numerous writings. The bulk of the writing is in the form of letters, and is of great value to the student of the history of the United States.

Septima 2011: [www.rosebud.org/2011](http://www.rosebud.org/2011)

...prevent bypassing of any circulating etc.

800

## Klinische Studien

75-04 was collected and analyzed as follows:

Forest Wildlife Laboratory Report No. 1731, the basic analyzing materials for the initial run. Two "modules for the Edin system of wood," and accompanying case the "Powersheet," a wild typing module was furnished 0.39), its general appearance, and the reported responsibility in relation Taking into consideration the specific gravity of the specimen (medium



Moisture content	Dry-bulb	Wet-bulb depression	Wet-bulb	Relative humidity	Equilibrium moisture content
Percent	°F.	°F.	°F.	Percent	Percent
Green - 35	120	7	113	61	14.1
35 - 31	120	10	110	72	12.1
31 - 28	120	15	105	60	9.7
28 - 24	130	25	105	43	6.8
24 - 20	140	40	100	25	4.1
20 - 15	150	50	100	18	2.9
15 - final <sup>1</sup>	180	50	130	26	3.3
Equalizing <sup>2</sup>	180	35	145	41	3.0
Conditioning	180	8	172	83	12.2

<sup>1</sup>Arrest sample, 5 percent.

<sup>2</sup>Continued until 3 wettest samples averaged about 6 percent.

After 3 days, 21 hours of drying, the moisture content of the three

**Drying Procedure** - 21 percent. Intermediate moisture content

Immediately before commencing Run 1, kiln samples marked "A" were reweighed, and it was determined that the moisture content values of these now ranged from 25.3 to 30.5 percent.

The run started at 2 p.m., May 15, 1959, with an initial dry-bulb temperature of 125° F. and a wet-bulb depression of 7° F. Changes in kiln conditions were generally made on the basis of the average moisture content of the three wettest samples using values derived from the arbitrarily high initial values. As drying progressed, it was considered desirable to further modify the drying schedule by estimating beforehand a drying curve

No.	Date	Time	Temp.	Humidity	Wind	Direction	Remarks
1	1890	10	120	113	7		14.1
2	1890	10	120	110	10		12.1
3	1890	12	120	100	12		9.7
4	1890	12	120	100	12		8.3
5	1890	12	120	100	12		4.1
6	1890	12	120	100	12		12.1
7	1890	12	120	100	12		12.1
8	1890	12	120	100	12		12.1
9	1890	12	120	100	12		12.1
10	1890	12	120	100	12		12.1
11	1890	12	120	100	12		12.1
12	1890	12	120	100	12		12.1
13	1890	12	120	100	12		12.1
14	1890	12	120	100	12		12.1
15	1890	12	120	100	12		12.1
16	1890	12	120	100	12		12.1
17	1890	12	120	100	12		12.1
18	1890	12	120	100	12		12.1
19	1890	12	120	100	12		12.1
20	1890	12	120	100	12		12.1
21	1890	12	120	100	12		12.1
22	1890	12	120	100	12		12.1
23	1890	12	120	100	12		12.1
24	1890	12	120	100	12		12.1
25	1890	12	120	100	12		12.1
26	1890	12	120	100	12		12.1
27	1890	12	120	100	12		12.1
28	1890	12	120	100	12		12.1
29	1890	12	120	100	12		12.1
30	1890	12	120	100	12		12.1
31	1890	12	120	100	12		12.1
32	1890	12	120	100	12		12.1
33	1890	12	120	100	12		12.1
34	1890	12	120	100	12		12.1
35	1890	12	120	100	12		12.1
36	1890	12	120	100	12		12.1
37	1890	12	120	100	12		12.1
38	1890	12	120	100	12		12.1
39	1890	12	120	100	12		12.1
40	1890	12	120	100	12		12.1
41	1890	12	120	100	12		12.1
42	1890	12	120	100	12		12.1
43	1890	12	120	100	12		12.1
44	1890	12	120	100	12		12.1
45	1890	12	120	100	12		12.1
46	1890	12	120	100	12		12.1
47	1890	12	120	100	12		12.1
48	1890	12	120	100	12		12.1
49	1890	12	120	100	12		12.1
50	1890	12	120	100	12		12.1
51	1890	12	120	100	12		12.1
52	1890	12	120	100	12		12.1
53	1890	12	120	100	12		12.1
54	1890	12	120	100	12		12.1
55	1890	12	120	100	12		12.1
56	1890	12	120	100	12		12.1
57	1890	12	120	100	12		12.1
58	1890	12	120	100	12		12.1
59	1890	12	120	100	12		12.1
60	1890	12	120	100	12		12.1
61	1890	12	120	100	12		12.1
62	1890	12	120	100	12		12.1
63	1890	12	120	100	12		12.1
64	1890	12	120	100	12		12.1
65	1890	12	120	100	12		12.1
66	1890	12	120	100	12		12.1
67	1890	12	120	100	12		12.1
68	1890	12	120	100	12		12.1
69	1890	12	120	100	12		12.1
70	1890	12	120	100	12		12.1
71	1890	12	120	100	12		12.1
72	1890	12	120	100	12		12.1
73	1890	12	120	100	12		12.1
74	1890	12	120	100	12		12.1
75	1890	12	120	100	12		12.1
76	1890	12	120	100	12		12.1
77	1890	12	120	100	12		12.1
78	1890	12	120	100	12		12.1
79	1890	12	120	100	12		12.1
80	1890	12	120	100	12		12.1
81	1890	12	120	100	12		12.1
82	1890	12	120	100	12		12.1
83	1890	12	120	100	12		12.1
84	1890	12	120	100	12		12.1
85	1890	12	120	100	12		12.1
86	1890	12	120	100	12		12.1
87	1890	12	120	100	12		12.1
88	1890	12	120	100	12		12.1
89	1890	12	120	100	12		12.1
90	1890	12	120	100	12		12.1
91	1890	12	120	100	12		12.1
92	1890	12	120	100	12		12.1
93	1890	12	120	100	12		12.1
94	1890	12	120	100	12		12.1
95	1890	12	120	100	12		12.1
96	1890	12	120	100	12		12.1
97	1890	12	120	100	12		12.1
98	1890	12	120	100	12		12.1
99	1890	12	120	100	12		12.1
100	1890	12	120	100	12		12.1

The following table shows the results of the experiments conducted during the month of February 1890. The experiments were conducted in a room of 1200 cubic feet, with a temperature of 120° F. and a wet-bulb depression of 7° F. Changes in the humidity were generally made on the basis of the average moisture content of the three wettest samples with which the humidity was compared. As drying progressed, it was found that the humidity was not uniform throughout the room, and a correction was made for this. The results of the experiments are given in the following table.



for the wettest zone in the wettest kiln sample. The changes in the relative humidity then were delayed until this zone was no more than 10 percent above the moisture content value at which the C4 wet-bulb depression schedule changes would be made. Also by arbitrarily selecting the highest moisture value of the several moisture sections, as outlined above, the time for applying high kiln temperatures which might cause collapse or honeycomb of the wet zones was delayed.

Since the average moisture content of the three wettest samples had dropped from 54 percent at the beginning of the run to 39.3 percent after 24 hours of drying, it was decided at 5 p.m., May 20, to make the first change in wet-bulb depression (from 7° to 10°). At 2 p.m., May 21, it was determined that the average moisture content of the three wettest kiln samples had been reduced to 31 percent. Consequently, a change in the wet-bulb depression was made at 4 p.m. on that day, going to 15° F. Two kiln changes were made during the third day.

After 3 days, 23 hours of drying, the moisture content of the three wettest samples averaged 19 percent. Intermediate moisture content determinations (U.S. Forest Products Laboratory Report 1607) were made, and it was evident that the wet zones had disappeared completely. Equalizing was begun, therefore, at 1:15 p.m., May 23, setting the dry-bulb temperature at 150° F., with a depression of 35° F. This was continued for almost 27 hours, until 4 p.m., May 24, when conditioning commenced. For this, conditions were set at 180° - 170° F. and continued for 16-3/4 hours, until 8:45 a.m., May 25--a total run of 5 days, 19 hours, including the period for equalizing and conditioning.

For the present case the various data samples. The changes in the type  
the quality then were almost until this was not as much as in some  
above the various points when at night the 24-hourly average was  
changes were not made. Also by statistically selecting the right values  
value of the several various points, as follows: from the 1st to  
applying high the temperature which of the data values as follows as  
the wet comes was better.

Since the average relative content of the three various samples was  
dropped from 34 percent at the beginning of the run to 28.1 percent after  
24 hours of drying. It was decided at 3 p.m. on May 21 to run the three  
change in wet-bulb depression (from 7° to 10°). At 2 p.m., May 21, it was  
determined that the average relative content of the three samples was  
samples had been reduced to 21 percent. Consequently, a change in the  
wet-bulb depression was made at 2 p.m. on that day, from 10° to 12°. The  
kin change was made during the night run.

After 3 days, 24 hours of drying, the relative content of the three  
samples was 17.7 percent. Consequently, a change in the  
wet-bulb depression was made at 2 p.m. on that day, from 12° to 14°. The  
kin change was made during the night run.  
After 5 days, 24 hours of drying, the relative content of the three  
samples was 15.7 percent. Consequently, a change in the  
wet-bulb depression was made at 2 p.m. on that day, from 14° to 16°. The  
kin change was made during the night run.  
After 7 days, 24 hours of drying, the relative content of the three  
samples was 13.7 percent. Consequently, a change in the  
wet-bulb depression was made at 2 p.m. on that day, from 16° to 18°. The  
kin change was made during the night run.  
After 9 days, 24 hours of drying, the relative content of the three  
samples was 11.7 percent. Consequently, a change in the  
wet-bulb depression was made at 2 p.m. on that day, from 18° to 20°. The  
kin change was made during the night run.  
After 11 days, 24 hours of drying, the relative content of the three  
samples was 9.7 percent. Consequently, a change in the  
wet-bulb depression was made at 2 p.m. on that day, from 20° to 22°. The  
kin change was made during the night run.  
After 13 days, 24 hours of drying, the relative content of the three  
samples was 7.7 percent. Consequently, a change in the  
wet-bulb depression was made at 2 p.m. on that day, from 22° to 24°. The  
kin change was made during the night run.  
After 15 days, 24 hours of drying, the relative content of the three  
samples was 5.7 percent. Consequently, a change in the  
wet-bulb depression was made at 2 p.m. on that day, from 24° to 26°. The  
kin change was made during the night run.  
After 17 days, 24 hours of drying, the relative content of the three  
samples was 3.7 percent. Consequently, a change in the  
wet-bulb depression was made at 2 p.m. on that day, from 26° to 28°. The  
kin change was made during the night run.  
After 19 days, 24 hours of drying, the relative content of the three  
samples was 1.7 percent. Consequently, a change in the  
wet-bulb depression was made at 2 p.m. on that day, from 28° to 30°. The  
kin change was made during the night run.



At the completion of the run, the kiln door was left slightly ajar and the vents open during the cooling period.

Moisture content values of the kiln samples, back to the beginning of the run, were recalculated on the basis of the intermediate moisture content results. Using the recalculated values, the actual drying conditions on Run 1 were as follows:

Moisture content at start of step	Temperature Dry- bulb	Wet-bulb depression	Wet- bulb	Relative humidity	Equilibrium moisture content	Time
Percent	°F.	°F.	°F.	Percent	Percent	Hr.
50.8	120	7	113	80	14.1	$\frac{1}{10}$
35.3	120	10	110	72	12.1	$\frac{1}{27}$
24.9	120	15	105	60	9.7	$\frac{1}{50}$
18.7	130	25	105	43	6.8	$\frac{1}{66.5}$
15.7	140	40	100	25	4.1	$\frac{1}{73}$
8.9	139	44	95	30	3.6	$\frac{1}{95.2}$
Equalizing	130	35	115	34	5.0	26.8
Conditioning	130	10	170	79	11.1	16.8
Total Time.....						138.8

<sup>1</sup>Time elapsed in drying (per period otherwise).

cross section showed no visibly wet spot.

Figure 1 shows the temperature, relative humidity, and the average moisture content of the three wettest samples, recalculated basis, during the run.

At the completion of the test, the sample was left slightly ajar and the vents were sealed the cooling period.

Before commencing the test, the sample was back to the beginning

of the test, were resealed, on the basis of the intermediate moisture

content results. Using the resealed values, the actual drying conditions

on this test are as follows:

Moisture	Temperature	Relative Humidity	Moisture	Time
100%	100°F	100%	100%	100%
90%	100°F	100%	90%	100%
80%	100°F	100%	80%	100%
70%	100°F	100%	70%	100%
60%	100°F	100%	60%	100%
50%	100°F	100%	50%	100%
40%	100°F	100%	40%	100%
30%	100°F	100%	30%	100%
20%	100°F	100%	20%	100%
10%	100°F	100%	10%	100%
0%	100°F	100%	0%	100%

At the completion of the test, the sample was left slightly ajar and the vents were sealed the cooling period.

Before commencing the test, the sample was back to the beginning of the test, were resealed, on the basis of the intermediate moisture content results. Using the resealed values, the actual drying conditions on this test are as follows:



### Analysis of Run 1 kiln samples after conditioning and 2-1/2 days drying, with a range

The moisture content values of the cross sections--average at mid-length and those separated by visual examination into dry and wet zones--are shown in table 1. From this it will be seen that in the middle sections the range extended from 24 percent, the driest, to 60 percent, the wettest. The average for all sections was 38.2 percent. In the dry zones the range was from 23.8 to 34.8 percent, and the average was 26.2 percent. These values compared with a high of 81 percent in the wettest wet zone and an average of all wet zones of 52.5 percent.

In table 2 a comparison is given between the arbitrary initial moisture content values assigned to each kiln sample, as cited in table 1, and that established by recalculation on the basis of the moisture content of the intermediate sections cut after 4 days of drying. This shows that the actual average moisture content values generally were lower than the arbitrarily used values. The danger of honeycombing and collapse would be greatest when wet zones were above 30 percent moisture content. Accepted kiln schedules, however, make use of average values which allow for normal differences between the dry shell and a wetter core. Thus, the use of arbitrary values appears justified to protect the stock during the first part of drying, but intermediate moisture content determinations would have been justified at the end of 2-1/2 to 3 days, or as soon as a test cross section showed no visibly wet spot.

The moisture content of the kiln samples before and after drying, equalizing, and conditioning is indicated in table 3. The average moisture

The relative content of the two sections—average of 51%—  
 leaves the three separated by about 10% (Table 1). From this it will be seen that in the middle section  
 the ratio exceeded 10% (Table 1), the ratio, in 5% percent, the ratio.  
 The average for all sections was 51.1 percent. In the dry season the ratio  
 was from 17.5 to 34.8 percent, and the average was 25.1 percent. These  
 values compare with a high of 51 percent in the wettest wet zone and an  
 average of all wet zones of 35.8 percent.

In Table 2 a comparison is given between the relative rainfall moisture  
 content values assigned to each area, as cited in Table 1, and the  
 estimated by calculation, on the basis of the relative content of the  
 intermediate sections and other 4 days of drying. This shows that the  
 actual average relative content values generally were lower than the esti-  
 mated values. The degree of underestimating was different in the  
 greatest and least areas (see above 50 percent relative content). In the  
 51% section, however, there was no average relative content after the actual  
 difference between the dry and wet zones. Thus, the dry zone  
 relative values were justified in 1940 and the wet zone relative values  
 just of 1940, but intermediate relative content was estimated with  
 have been justified at the end of 1-1/2 to 2 days, or as near as a last  
 cross section shown as clearly wet.

The relative content of the 51% section (Table 1) was 51.1 percent  
 according to calculation is indicated in Table 2. The average relative



content for all the samples after conditioning was 8.4 percent, with a range for the 19 sections from 7.9 percent for the driest to 8.8 percent for the wettest. This was well within the objective, to obtain an overall average of the original 10 between 7.9 and 8.8 percent, and a conditional specimen selected of 8 percent within a marginal range of  $\pm 1$  percent.

Final test sections for the determination of moisture distribution in larger boards consisted of three charges. The kiln samples were well-coated with shell and core, average moisture content, and residual stress were cut. The results are shown in table 4. While there were individual differences, the final moisture content sections showed the driest was 8.2 percent, the wettest was 8.8 percent, and the average for all sections was 8.3 percent.

The method of assigning arbitrary moisture content values to the shells ranged from 7.6 to 8.6 percent, with an average of 8.3 percent; while the cores had 7.9 percent. The moisture content of the 10 samples ranged from 7.2 percent for the driest, 9.2 percent for the wettest, and 8.6 percent as the average.

One kiln sample, 6-A, showed slight surface checking on the second day of run, but these checks had closed up 3 days later. Another sample, 1-A, had 24 inches of surface checks, which appeared on the fourth day of drying. A third sample, 9-A, had 23 inches of surface checks in the brown streak on the fourth day. Some slight collapse appeared in sample 3-A on the third day, although this may have been present earlier. One sample had honeycomb when the stock arrived, but kiln drying did not aggravate its condition. The wet zones completely disappeared before equalizing. All samples were free of collapse and stress 48 hours after completion of the run.

[illegible]

— 175 —



## Run 2

In the second run, 14 kiln samples were used. These were composed of the original 10 halves, marked "B," and 4 additional specimens selected at the beginning of Run 2 for their apparent dark, wet streaks. Several longer boards completed the charge. The kiln samples were end-coated with a roofing asphalt preparation and reweighed before placing in the charge. In an effort to overcome the surface checking observed in the exploratory run, a milder schedule was used.

The method of assigning arbitrary moisture content values to the kiln samples was essentially the same as in Run 1. Immediately on arrival at the Laboratory, the moisture content of the 10 "B" samples ranged from 23.8 to 60 percent, with the average of the three wettest being 56.8. The additional four kiln samples, cut and weighed immediately before Run 2

commenced, had 20.5 percent moisture content for the driest and 46.8 percent for the wettest, with the average of the two wettest being 34.2 percent.

### Kiln Schedule

In Run 2 a modified T5-C3 schedule was used, as follows:

115° F. wet-bulk temperature. These initial conditions were held for 48 hours. The controlling moisture content, in the bulk of the wettest samples, was 34.2 percent at the start. This was reduced to 21.3 percent average after 2 days of drying. Consequently, the wet-bulk temperature was increased to 125° F. Eighteen hours later, at 8 a.m., June 1, the moisture content of the three wettest samples - 14 -

In the second run, 10 thin samples were used. These were numbered 1 through 10. The original 10 samples, marked "A", and 4 additional specimens selected at the beginning of Run 1 for their apparent size, were retained. Several of the thin samples were analyzed with larger samples registered in the range. The thin samples were analyzed with a feeding weight of 100 mg and weighed before feeding in the range. It is noted in parentheses the values showing agreement in the registration. The thin samples were used.

The method of assigning arbitrary moisture content values to the thin samples was essentially the same as in Run 1. Immediately on arrival at the laboratory, the moisture content of the 10 "A" samples ranged from 11.3 to 50 percent, with the average of the four wettest being 24.4. The additional four thin samples, not weighed immediately before use, were determined, but 10.5 percent moisture content for the driest and 50.4 percent for the wettest, with the average of the two wettest being 24.1 percent.

### Run 3

In Run 3 a modified T-3 schedule was used, as follows:



The wet-bulb depression was accordingly increased to 10° F. (Table 2).

Moisture content	Temperature			Relative humidity	Equilibrium moisture content
	Dry- bulb	Wet-bulb depression	Wet- bulb		
Percent	°F.	°F.	°F.	Percent	Percent
Green - 35	120	5	115	85	16.2
35 - 31	120	7	113	80	14.1
Drying, 31 - 27	120	10	110	72	12.1
27 - 24	130	15	115	62	9.7
24 - 20	140	20	120	54	8.0
20 - 15	150	25	125	44	6.9
15 - Final	160	50	110	21	3.2
Conditioning	170	3	162	82	12.4

### Drying Procedure

The plan was to make intermediate moisture content determinations when the three wettest samples had about 24 percent moisture content.

Drying could be accelerated if the wet zones had disappeared.

### Analysis of Run

This run commenced at 2 p.m., May 29, with 120° F. dry-bulb and 115° F. wet-bulb temperature. These initial conditions were held for the kiln samples at the time of cutting intermediate moisture sections 48 hours. The controlling moisture content, on the basis of the arbitrarily high initial values, was 54.6 percent at the start. This addition to the sections taken for average moisture content and dry had dropped to 33.8 percent average after 2 days of drying. Consequently, wet zones determined by visual examination, another section was cut. An adjustment was made in conditions; the wet-bulb depression was increased to 7° F. Eighteen hours later, at 8 a.m., June 1, the moisture content of the three wettest samples had dropped to 28.5 percent. Relative content of the dark steers approximated that of the wettest ones.





The wet-bulb depression was accordingly increased to  $1^{\circ}\text{F}$ . The dry-bulb temperature was still held at  $110^{\circ}\text{F}$ .

Intermediate moisture content sections were cut during the third day, when the average moisture content of the three wettest samples showed 26.6 percent. The moisture content for the wettest overdried sections was 22.2 percent. The dry-bulb temperature was therefore increased to  $120^{\circ}\text{F}$ . This depression was changed to  $15^{\circ}\text{F}$ . After 4 days of drying, the moisture content of the three wettest samples was 14 percent. Conditions were then adjusted to  $150^{\circ}\text{F}$  to  $125^{\circ}\text{F}$ . The charge was subjected to these conditions for 17 hours before stepping up to  $160^{\circ}\text{F}$  and a wet-bulb depression of  $30^{\circ}\text{F}$ . for a period of 24 hours. At the end of this period the average moisture content of the three wettest samples was 7.4 percent. On the basis of this, it was not considered necessary to equalize. Conditioning started at 8:30 a.m., June 4, at  $170^{\circ}\text{F}$  to  $132^{\circ}\text{F}$  and continued for 24 hours. The results are shown in table 7.

The total elapsed time involved in this run, including conditioning, was 6 days, 15-1/2 hours (see Fig. 2). Again the results were

that there was no collapse and waterlogging was fully relieved, but there

Analysis of Run

was a small amount of spotting of checks. This schedule is more satisfactory, however, than the one used in Run 1 in respect to drying defects. Perhaps, the kiln samples at the time of cutting intermediate moisture sections if no waterlogging had occurred during air drying, there would have been essentially the same as that at the beginning of Run 1. However, in Run 1, waterlogging defects. If the final drying step had been lengthened in addition to the sections taken for average moisture content and dry and 12 hours and the conditioning period decreased to 15 hours, a lower final wetness determined by visual examination, another section was cut for moisture content could have been achieved.

Dark-colored zones within or adjacent to the brown heart and light-colored zones. The object of this latter test was to determine whether the moisture content of the dark streaks approximated that of the wettest areas.

The wet-bulb depression was accordingly increased to 10° F. The dry-

bulb depression was still 10° F.

Intermediate relative humidity values were determined in this

way, when the wet-bulb depression and the dry-bulb depression

were 10° F. apart. The relative humidity for the present experiment

section was 50% average. The dry-bulb depression was therefore in-

creased to 20° F. The depression was changed to 10° F. after a dry-

bulb, the relative humidity of the room (which was 10% average)

was determined by the method of 10° F. The change was subject-

ed to these conditions and the depression was changed to 10° F. after a dry-

bulb depression of 10° F. for a period of 10 hours. At the end of this

period the average relative humidity of the room was determined to be

50%. The dry-bulb depression was 10° F. and the wet-bulb depression was

20° F. The relative humidity was 50%, and the dry-bulb depression was

20° F. The relative humidity was 50%.

The total relative humidity was 50% in this case. The relative humidity

was 50% after 10 hours (see Table I). The relative humidity was

50% after 10 hours (see Table I). The relative humidity was

50% after 10 hours.

The procedure stated in determining the relative humidity in

Table I. The relative humidity was 50% after 10 hours (see Table I). The relative humidity was

50% after 10 hours (see Table I). The relative humidity was 50% after 10 hours (see Table I).

50% after 10 hours (see Table I). The relative humidity was 50% after 10 hours (see Table I).

50% after 10 hours (see Table I). The relative humidity was 50% after 10 hours (see Table I).

50% after 10 hours (see Table I). The relative humidity was 50% after 10 hours (see Table I).

50% after 10 hours (see Table I). The relative humidity was 50% after 10 hours (see Table I).

50% after 10 hours (see Table I). The relative humidity was 50% after 10 hours (see Table I).



The results are given in table 5. The dry zones and the light-colored zones agreed very well in moisture content at this stage of drying. There was less general agreement between moisture values of wet zones and dark zones, but in six cases the dark zones were as wet as or wetter than the selected wet or damp zones. operated on a time basis. The

The average moisture content values at the intermediate determinations were used to recalculate the starting moisture content of the kiln samples. A comparison of the starting moisture content based on the arbitrary initial moisture content values with the recalculated values is shown in table 6. This again shows that the actual average moisture content values were generally lower than those arbitrarily assigned, but the same comment as in Run 1 holds. The respective moisture content values of the 14 kiln samples at the various stages of Run 2 are also indicated in table 6.

The final moisture content and stress in sections from the kiln samples were cut the afternoon of June 5. The results are shown in table 7.

This kiln run took longer and gave stock at a moisture content higher than that of Run 1 because of the milder schedule. Again the results were that there was no collapse and casehardening was fully relieved, but there was a small amount of opening of checks. This schedule is more satisfactory, however, than the one used in Run 1 in respect to drying defects. Perhaps, if no surface checking had occurred during air drying, there would have been no kiln-drying defects. If the final drying step had been lengthened 12 hours and the conditioning period decreased to 18 hours, a lower final moisture content could have been achieved.

The results are given in Table 1. The first column shows the light intensity in foot-candles. The second column shows the number of fish in the tank. The third column shows the number of fish that died. The fourth column shows the number of fish that survived. The fifth column shows the number of fish that were lost. The sixth column shows the number of fish that were kept. The seventh column shows the number of fish that were sold. The eighth column shows the number of fish that were given away. The ninth column shows the number of fish that were donated. The tenth column shows the number of fish that were returned. The eleventh column shows the number of fish that were lost. The twelfth column shows the number of fish that were kept. The thirteenth column shows the number of fish that were sold. The fourteenth column shows the number of fish that were given away. The fifteenth column shows the number of fish that were donated. The sixteenth column shows the number of fish that were returned. The seventeenth column shows the number of fish that were lost. The eighteenth column shows the number of fish that were kept. The nineteenth column shows the number of fish that were sold. The twentieth column shows the number of fish that were given away. The twenty-first column shows the number of fish that were donated. The twenty-second column shows the number of fish that were returned. The twenty-third column shows the number of fish that were lost. The twenty-fourth column shows the number of fish that were kept. The twenty-fifth column shows the number of fish that were sold. The twenty-sixth column shows the number of fish that were given away. The twenty-seventh column shows the number of fish that were donated. The twenty-eighth column shows the number of fish that were returned. The twenty-ninth column shows the number of fish that were lost. The thirtieth column shows the number of fish that were kept. The thirty-first column shows the number of fish that were sold. The thirty-second column shows the number of fish that were given away. The thirty-third column shows the number of fish that were donated. The thirty-fourth column shows the number of fish that were returned. The thirty-fifth column shows the number of fish that were lost. The thirty-sixth column shows the number of fish that were kept. The thirty-seventh column shows the number of fish that were sold. The thirty-eighth column shows the number of fish that were given away. The thirty-ninth column shows the number of fish that were donated. The fortieth column shows the number of fish that were returned. The forty-first column shows the number of fish that were lost. The forty-second column shows the number of fish that were kept. The forty-third column shows the number of fish that were sold. The forty-fourth column shows the number of fish that were given away. The forty-fifth column shows the number of fish that were donated. The forty-sixth column shows the number of fish that were returned. The forty-seventh column shows the number of fish that were lost. The forty-eighth column shows the number of fish that were kept. The forty-ninth column shows the number of fish that were sold. The fiftieth column shows the number of fish that were given away. The fifty-first column shows the number of fish that were donated. The fifty-second column shows the number of fish that were returned. The fifty-third column shows the number of fish that were lost. The fifty-fourth column shows the number of fish that were kept. The fifty-fifth column shows the number of fish that were sold. The fifty-sixth column shows the number of fish that were given away. The fifty-seventh column shows the number of fish that were donated. The fifty-eighth column shows the number of fish that were returned. The fifty-ninth column shows the number of fish that were lost. The sixtieth column shows the number of fish that were kept. The sixty-first column shows the number of fish that were sold. The sixty-second column shows the number of fish that were given away. The sixty-third column shows the number of fish that were donated. The sixty-fourth column shows the number of fish that were returned. The sixty-fifth column shows the number of fish that were lost. The sixty-sixth column shows the number of fish that were kept. The sixty-seventh column shows the number of fish that were sold. The sixty-eighth column shows the number of fish that were given away. The sixty-ninth column shows the number of fish that were donated. The seventieth column shows the number of fish that were returned. The seventy-first column shows the number of fish that were lost. The seventy-second column shows the number of fish that were kept. The seventy-third column shows the number of fish that were sold. The seventy-fourth column shows the number of fish that were given away. The seventy-fifth column shows the number of fish that were donated. The seventy-sixth column shows the number of fish that were returned. The seventy-seventh column shows the number of fish that were lost. The seventy-eighth column shows the number of fish that were kept. The seventy-ninth column shows the number of fish that were sold. The eightieth column shows the number of fish that were given away. The eighty-first column shows the number of fish that were donated. The eighty-second column shows the number of fish that were returned. The eighty-third column shows the number of fish that were lost. The eighty-fourth column shows the number of fish that were kept. The eighty-fifth column shows the number of fish that were sold. The eighty-sixth column shows the number of fish that were given away. The eighty-seventh column shows the number of fish that were donated. The eighty-eighth column shows the number of fish that were returned. The eighty-ninth column shows the number of fish that were lost. The ninetieth column shows the number of fish that were kept. The ninety-first column shows the number of fish that were sold. The ninety-second column shows the number of fish that were given away. The ninety-third column shows the number of fish that were donated. The ninety-fourth column shows the number of fish that were returned. The ninety-fifth column shows the number of fish that were lost. The ninety-sixth column shows the number of fish that were kept. The ninety-seventh column shows the number of fish that were sold. The ninety-eighth column shows the number of fish that were given away. The ninety-ninth column shows the number of fish that were donated. The hundredth column shows the number of fish that were returned.



# Run 3

## Kiln Schedule

For the final run a still milder schedule, a modified T3-C3 schedule was used. It was, however, operated on a time basis. The charge was composed of six kiln samples, the remainders of boards 11, 13, and 14 from Run 2 and three other pieces. The samples were end coated with a roofing asphalt preparation. A number of additional short lengths of boards remaining from the original material were also dried in this run. The modified T3-C3 schedule was as follows:

Time	Temperature			Relative humidity	Equilibrium moisture content
	Dry-bulb	Wet-bulb	Wet-bulb depression		
Interval to	°F.	°F.	°F.	Percent	Percent
After 10 - 24	110	5	105	84	16.2
24 - 48	120	7	113	80	14.1
48 - 72	130	10	120	73	12.1
72 - 96	140	15	125	64	9.6
96 - 120	150	20	130	57	8.0
Equalizing					
120 - 151	160	40	120	31	4.3
Conditioning					
151 - 167	170	10	160	78	11.3





The losses for the charge & into were estimated from the drying

curves of runs 1 and 2. : moisture content : 11.0 :  
: at start of run : 1 : time

Drying Procedure : bulb : depression : bulb : driest : wettest :  
: sample : sample :

In this final run the initial conditions were milder than in the  
previous runs. Later on an attempt was made to accelerate the drying  
rate and shorten the drying period. Although kiln samples were selected  
regularly, the conditions changed after each 24 hours of drying regardless  
of the calculated moisture content values.

The run started at 9 a.m., June 12, with 110° to 105° F. At the end  
of each 24-hour period, the wet-bulb temperature was increased 10 degrees  
and the wet-bulb depression increased likewise to 7, 10, 15, and 20  
degrees.

Representative moisture sections were cut after 4 days of drying, when  
the moisture content of the driest sample had reached 13.5 percent.

After 120 hours of drying, the charge was equalized at 160° to 120° F. for  
30-40 hours. Final conditioning was then carried out for 15 hours at  
175° F. with a wet-bulb depression of 10° F. The total elapsed time,  
including equalizing and conditioning, was just short of 7 days. This is  
comparable with the period for Run 2.

The actual drying conditions during this run were as follows:  
A section was cut from each board selected for kiln  
section was cut to provide a wet block from the dryer area and a dry  
section from the hot zone. Again, the weighted average of the moisture  
content of the dry and wet zones is used to obtain the average  
moisture value of all the sections from each board was used as the

the initial conditions were chosen in such

a way that the solution was not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated

and the results were not too complicated











...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...

...the ... of the ...



All the samples were free of collapse and drying stress 48 hours after completion of the run. The final moisture content, average and distribution, and casehardening test results are shown in table 9. These shows that, except for the core of one section from sample 15-2, all moisture values were within a range of 1.3 percent and the average of all was between 8 and 9 percent. The one wet core had a few dark streaks in it. The adjacent section could not have had such a high moisture content in its core or it all would have had a higher average moisture content.

days on this schedule, and it is believed that with a schedule

#### Summary of Three Runs

It was found possible to kiln dry previously air-dried virolo (*Dialyanthera* s.p.) containing "brown heart" and wet streaks by a variety of low-temperature kiln schedules without collapse. When air-dried stock already contains surface checking, such as this did, mild relative humidity conditions are necessary at the start to avoid extension of the checks. In fact, too severe a relative humidity can open new checks.

Assignment of arbitrarily high moisture content values to samples containing visibly wet areas in the initial moisture sections by taking an unweighted average of the wet zone and the dry zone is a workable device to protect the stock against collapse and honeycombing when used in conjunction with a low-temperature schedule until the average moisture content of the controlling samples is below 20 percent. Intermediate moisture content sections should be cut when this controlling moisture value is about 15 or 14 percent. If all visibly wet zones are gone, the controlling moisture

all the samples were first of all... after... and... all was between 8 and 9 percent. The one wet core had a low data... in 1c. The adjacent section could not have had such a high moisture... in 1c core or 1c all would have had a higher average moisture...

Summary of Data

It was found possible to obtain any previously... "brown heart" and wet... of the... along... are necessary at the start to avoid extension of the cracks. It...

Assignment of arbitrarily high moisture content values to samples... of the... to prevent the... the... the... to prevent...



content can safely be assumed to be at the previously determined average moisture content or below. As soon as the intermediate moisture content values are calculated, new oven-dry weights for the samples can be calculated and the new moisture content values used to determine the rest of the drying conditions.

The best results, so far as minimum surface cracking is concerned, were obtained with Run 2. It is believed that this schedule will give as good results as any. Total drying time in the experimental run was between 6 and 7 days with this schedule, and it is believed that with a schedule of this type, a 2-day drying period could be obtained in a larger commercial kiln. Kiln drying, using conditions that would simulate factory conditions.

Very good moisture uniformity was achieved with each of the kiln runs, but there were considerable differences between the average moisture content values of the three runs. Comparative data are shown in table II.

No difficulty was encountered in relieving drying stresses. The material after kiln drying was going up after only short conditioned-storage periods. Storage of Kiln-Dried Material. In about equal to commercial practice, it was found that kiln drying, and long exposure from each run were stored in the dry air laboratory with temperature and relative humidity close to outdoor winter conditions. This would result in an equilibrium moisture content of about 12 percent. Rapid pickup of moisture by the stock to sweaters near this moisture content may have occurred.





## Examination of Dried Stock for Collapse

Five pieces of the kiln-dried material set aside for making a hot-press panel were examined<sup>4</sup> for collapse using a 20-power hand lens. No identification as to kiln runs was made. There was no general collapse. Some slight collapse was present in small zones immediately adjacent to surface checks. Some of the brown-stained cells had very thin walls.

End : Middle : Distribution section : center

### Hot-Pressed Five-Ply Panel Using Kiln-Dried Virola for Core

Percent : Percent : Percent : Percent : Percent

Two panels were made, the first about 1 month after completion of

the kiln drying, using conditions that would simulate factory conditions.

The other was made after carefully conditioning the material about 8 months

in a 30 percent relative humidity atmosphere. The first panel was very

wavy. The second was flat within the limits of normal sanding. Since

the former method, including poorly controlled storage of the material

after kiln drying and gluing-up after only short conditioned-storage

average of :

of the components, is about equal to commercial practice, it was con-

cluded that virola lumber with brown streaks is unsuitable for hot-press

panel core stock.

average of middle and end.

Examination of Effect of Heat for Collapsing

Five pieces of the film-titled material were made for making a panel  
which panel was examined for collapse using a 100-gram load. The  
identification as to film type was made. There was no general collapse,  
some slight collapse was present in small areas immediately adjacent to  
the edges. Some of the heat-treated cells had very thin walls.

Heat-Treated Five-Fly Panel Using

Thin-Walled Vitro for Panel

Two panels were made, the first about 1 month after completion of  
the film drying, using conditions that would simulate service conditions.  
The other was made after carefully conditioning the material about 2 months  
in a 50 percent relative humidity atmosphere. The first panel was very  
wavy. The second was flat within the limits of normal settling. Using  
the former method, including yearly controlled storage at the material  
after film drying and giving-up after only short conditioning-storage  
at the components, it was found in commercial practice, it was com-  
pleted that vitrols under high pressure are available for use in  
panel core stock.



Table 1.--Initial moisture content for kiln samples "A" in lot 1

Sample No.	Moisture content of sections					Kiln sample moisture content value used
	End section	Middle section	Distribution section			
			Dry zone	Wet zone	Average of dry and wet zones	
	Percent	Percent	Percent	Percent	Percent	Percent
1-A	22.8	25.0	24.1	25.6	24.3	23.8
2-A	60.2	60.6	27.0	81.0	54.0	60.0
3-A	33.0	45.1	26.6	65.0	45.8	45.8
4-A	26.6	31.7	32.2	68.7	50.5	50.5
5-A	22.9	32.4	.....	32.9	.....	32.9
					44.5	
6-A	27.9	44.7	33.5	60.7	47.1	47.1
7-A	43.0	39.4	34.8	65.6	50.2	50.2
8-A	17.4	24.7	25.1	29.8	27.5	27.5
9-A	27.1	24.0	23.8	23.8	23.8	25.5
10-A	29.3	43.4	34.6	72.9	39.3	53.8
					22.6	
Average of 3 unit test	43.3	51.1	34.3	74.2	39.9	54.8
Average of all	31.1	38.2	26.2	52.5	31.2	

Average of middle and end.

Five classes of ...

Table 1. - ...

Distribution section		Percent		Percent		Percent		Percent	
Value used	Content	Value used	Content	Value used	Content	Value used	Content	Value used	Content
10-A	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
9-A	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
8-A	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
7-A	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
6-A	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5-A	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4-A	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
3-A	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2-A	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1-A	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Average of 10		Average of 10		Average of 10		Average of 10		Average of 10	
10.0		10.0		10.0		10.0		10.0	



Table 2.--Comparative initial moisture content  
of sila samples in Run 1

Sample No.	Arbitrary values		Recalculated values from intermediate moisture content	
	Percent		Percent	
1-A	79.3	6.6	5.4	8.1
2-A	28 25.0	7.2	5.9 25.7	8.2
3-A	60.0		65.0	
4-A	37 45.8	7.5	6.2 44.5	8.3
5-A	43 50.5	8.6	5.8 28.4	7.8
6-A	23 32.9	6.7	5.7 29.0	8.7
7-A	27.6	6.5	5.6	8.4
8-A	39 47.1	7.3	6.0 37.7	8.5
9-A	58.2		44.0	
10-A	27.5		22.0	
11-A	25.5	6.9	8.3 27.2	8.8
12-A	33.8		39.9	
Average of :				
Average of :	36.6	7.4	5.9	8.4
3 wettest :	34.8		31.2	

Average of : -- intermediate moisture content determinations.  
all values at start of run differ from initial values because of  
drying or wetting during storage.





Table 1.--Moisture content of kiln samples during run 1

Sample No.	Moisture content <sup>1</sup>			
	Start	Before	After	After
	of run	of equalizing	of equalizing	of conditioning
	Percent	Percent	Percent	Percent
1-A	26.5	6.6	5.7	8.3
2-A	33.8	9.7	6.7	8.5
3-A	34.8	8.3	6.0	8.2
4-A	29.8	6.6	5.4	8.4
5-A	29.4	7.2	5.9	8.3
6-A	37.1	7.5	6.2	8.8
7-A	43.8	8.6	5.8	7.8
8-A	23.7	6.7	5.7	8.7
9-A	27.6	5.5	5.4	8.4
10-A	39.0	7.3	6.0	8.5
Average of 3 wettest	50.8	8.9	8.3	8.8
Average of all	36.6	7.5	5.9	8.4
Moist	7.6	7.3	6.2	

<sup>1</sup>Values based on intermediate moisture content determinations. Values at start of run differ from initial values because of drying or wetting during storage.

TABLE 2. ANALYSIS OF VARIANCE FOR THE EFFECT OF TREATMENT ON THE GROWTH OF THE FISHES

Source of variation		Sum of squares		Degrees of freedom		Mean square		F-value	
Treatment		Sum of squares		Degrees of freedom		Mean square		F-value	
Between groups		Sum of squares		Degrees of freedom		Mean square		F-value	
Within groups		Sum of squares		Degrees of freedom		Mean square		F-value	
Total		Sum of squares		Degrees of freedom		Mean square		F-value	
1. Control		0.00	1	0.00	1	0.00	1	0.00	1
2. 10% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
3. 20% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
4. 30% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
5. 40% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
6. 50% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
7. 60% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
8. 70% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
9. 80% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
10. 90% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
11. 100% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
12. 110% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
13. 120% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
14. 130% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
15. 140% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
16. 150% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
17. 160% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
18. 170% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
19. 180% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
20. 190% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
21. 200% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
22. 210% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
23. 220% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
24. 230% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
25. 240% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
26. 250% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
27. 260% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
28. 270% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
29. 280% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
30. 290% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
31. 300% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
32. 310% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
33. 320% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
34. 330% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
35. 340% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
36. 350% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
37. 360% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
38. 370% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
39. 380% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
40. 390% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
41. 400% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
42. 410% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
43. 420% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
44. 430% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
45. 440% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
46. 450% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
47. 460% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
48. 470% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
49. 480% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
50. 490% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
51. 500% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
52. 510% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
53. 520% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
54. 530% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
55. 540% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
56. 550% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
57. 560% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
58. 570% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
59. 580% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
60. 590% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
61. 600% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
62. 610% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
63. 620% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
64. 630% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
65. 640% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
66. 650% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
67. 660% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
68. 670% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
69. 680% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
70. 690% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
71. 700% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
72. 710% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
73. 720% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
74. 730% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
75. 740% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
76. 750% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
77. 760% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
78. 770% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
79. 780% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
80. 790% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
81. 800% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
82. 810% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
83. 820% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
84. 830% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
85. 840% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
86. 850% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
87. 860% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
88. 870% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
89. 880% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
90. 890% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
91. 900% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
92. 910% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
93. 920% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
94. 930% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
95. 940% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
96. 950% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
97. 960% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
98. 970% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
99. 980% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
100. 990% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1
101. 1000% Vitamin C		0.00	1	0.00	1	0.00	1	0.00	1

1. The data are based on the analysis of variance for the growth of the fish. The results are given in the form of the F-value and the P-value. The F-value is the ratio of the mean square of the treatment to the mean square of the error. The P-value is the probability that the difference between the treatment and the control is due to chance.



Table 4.--Final moisture content and stress test  
Results at end of Run 1

Sample No.	moisture content	hardness
	Shell : Corn : Average :	
	Percent : Percent : Percent :	
1-A	7.8 : 7.9	8.2
2-A	7.7 : 8.6	8.5
3-A	8.8 : 9.2	8.8
4-A	8.8 : 8.7	8.2
5-A	7.6 : 8.3	8.5
6-A	8.3 : 8.6	8.4
7-A	8.3 : 8.9	8.7
8-A	8.2 : 8.8	8.5
9-A	8.1 : 8.5	8.3
10-A	8.1 : 8.5	8.3
Average of all	8.3 : 8.6	8.3
wettest	8.8 : 9.2	8.8
driest	7.6 : 7.9	8.2

all : 15.1 : 16.6 : 16.1 : 22.4 : 21.5

As some was not visibly wet, the one that felt the dampest or gave most color with an indelible pencil was selected.

TABLE 1.—*Summary of the results of the survey of the  
fisheries of the Chesapeake Bay, 1900.*

Species	Total catch, in pounds			Value, in dollars
	1900	1901	1902	
<i>Menidia menidia</i>	1,200	1,500	1,800	1.20
<i>Merluccius merluccius</i>	2,500	3,000	3,500	2.50
<i>Paralichthys dentatus</i>	3,000	3,500	4,000	3.00
<i>Stenotomus chrysops</i>	4,000	4,500	5,000	4.00
<i>Urophycis regia</i>	5,000	5,500	6,000	5.00
<i>Urophycis viridis</i>	6,000	6,500	7,000	6.00
<i>Urophycis regia</i>	7,000	7,500	8,000	7.00
<i>Urophycis viridis</i>	8,000	8,500	9,000	8.00
<i>Urophycis regia</i>	9,000	9,500	10,000	9.00
<i>Urophycis viridis</i>	10,000	10,500	11,000	10.00
<i>Urophycis regia</i>	11,000	11,500	12,000	11.00
<i>Urophycis viridis</i>	12,000	12,500	13,000	12.00
<i>Urophycis regia</i>	13,000	13,500	14,000	13.00
<i>Urophycis viridis</i>	14,000	14,500	15,000	14.00
<i>Urophycis regia</i>	15,000	15,500	16,000	15.00
<i>Urophycis viridis</i>	16,000	16,500	17,000	16.00
<i>Urophycis regia</i>	17,000	17,500	18,000	17.00
<i>Urophycis viridis</i>	18,000	18,500	19,000	18.00
<i>Urophycis regia</i>	19,000	19,500	20,000	19.00
<i>Urophycis viridis</i>	20,000	20,500	21,000	20.00
<i>Urophycis regia</i>	21,000	21,500	22,000	21.00
<i>Urophycis viridis</i>	22,000	22,500	23,000	22.00
<i>Urophycis regia</i>	23,000	23,500	24,000	23.00
<i>Urophycis viridis</i>	24,000	24,500	25,000	24.00
<i>Urophycis regia</i>	25,000	25,500	26,000	25.00
<i>Urophycis viridis</i>	26,000	26,500	27,000	26.00
<i>Urophycis regia</i>	27,000	27,500	28,000	27.00
<i>Urophycis viridis</i>	28,000	28,500	29,000	28.00
<i>Urophycis regia</i>	29,000	29,500	30,000	29.00
<i>Urophycis viridis</i>	30,000	30,500	31,000	30.00
<i>Urophycis regia</i>	31,000	31,500	32,000	31.00
<i>Urophycis viridis</i>	32,000	32,500	33,000	32.00
<i>Urophycis regia</i>	33,000	33,500	34,000	33.00
<i>Urophycis viridis</i>	34,000	34,500	35,000	34.00
<i>Urophycis regia</i>	35,000	35,500	36,000	35.00
<i>Urophycis viridis</i>	36,000	36,500	37,000	36.00
<i>Urophycis regia</i>	37,000	37,500	38,000	37.00
<i>Urophycis viridis</i>	38,000	38,500	39,000	38.00
<i>Urophycis regia</i>	39,000	39,500	40,000	39.00
<i>Urophycis viridis</i>	40,000	40,500	41,000	40.00
<i>Urophycis regia</i>	41,000	41,500	42,000	41.00
<i>Urophycis viridis</i>	42,000	42,500	43,000	42.00
<i>Urophycis regia</i>	43,000	43,500	44,000	43.00
<i>Urophycis viridis</i>	44,000	44,500	45,000	44.00
<i>Urophycis regia</i>	45,000	45,500	46,000	45.00
<i>Urophycis viridis</i>	46,000	46,500	47,000	46.00
<i>Urophycis regia</i>	47,000	47,500	48,000	47.00
<i>Urophycis viridis</i>	48,000	48,500	49,000	48.00
<i>Urophycis regia</i>	49,000	49,500	50,000	49.00
<i>Urophycis viridis</i>	50,000	50,500	51,000	50.00
<i>Urophycis regia</i>	51,000	51,500	52,000	51.00
<i>Urophycis viridis</i>	52,000	52,500	53,000	52.00
<i>Urophycis regia</i>	53,000	53,500	54,000	53.00
<i>Urophycis viridis</i>	54,000	54,500	55,000	54.00
<i>Urophycis regia</i>	55,000	55,500	56,000	55.00
<i>Urophycis viridis</i>	56,000	56,500	57,000	56.00
<i>Urophycis regia</i>	57,000	57,500	58,000	57.00
<i>Urophycis viridis</i>	58,000	58,500	59,000	58.00
<i>Urophycis regia</i>	59,000	59,500	60,000	59.00
<i>Urophycis viridis</i>	60,000	60,500	61,000	60.00
<i>Urophycis regia</i>	61,000	61,500	62,000	61.00
<i>Urophycis viridis</i>	62,000	62,500	63,000	62.00
<i>Urophycis regia</i>	63,000	63,500	64,000	63.00
<i>Urophycis viridis</i>	64,000	64,500	65,000	64.00
<i>Urophycis regia</i>	65,000	65,500	66,000	65.00
<i>Urophycis viridis</i>	66,000	66,500	67,000	66.00
<i>Urophycis regia</i>	67,000	67,500	68,000	67.00
<i>Urophycis viridis</i>	68,000	68,500	69,000	68.00
<i>Urophycis regia</i>	69,000	69,500	70,000	69.00
<i>Urophycis viridis</i>	70,000	70,500	71,000	70.00
<i>Urophycis regia</i>	71,000	71,500	72,000	71.00
<i>Urophycis viridis</i>	72,000	72,500	73,000	72.00
<i>Urophycis regia</i>	73,000	73,500	74,000	73.00
<i>Urophycis viridis</i>	74,000	74,500	75,000	74.00
<i>Urophycis regia</i>	75,000	75,500	76,000	75.00
<i>Urophycis viridis</i>	76,000	76,500	77,000	76.00
<i>Urophycis regia</i>	77,000	77,500	78,000	77.00
<i>Urophycis viridis</i>	78,000	78,500	79,000	78.00
<i>Urophycis regia</i>	79,000	79,500	80,000	79.00
<i>Urophycis viridis</i>	80,000	80,500	81,000	80.00
<i>Urophycis regia</i>	81,000	81,500	82,000	81.00
<i>Urophycis viridis</i>	82,000	82,500	83,000	82.00
<i>Urophycis regia</i>	83,000	83,500	84,000	83.00
<i>Urophycis viridis</i>	84,000	84,500	85,000	84.00
<i>Urophycis regia</i>	85,000	85,500	86,000	85.00
<i>Urophycis viridis</i>	86,000	86,500	87,000	86.00
<i>Urophycis regia</i>	87,000	87,500	88,000	87.00
<i>Urophycis viridis</i>	88,000	88,500	89,000	88.00
<i>Urophycis regia</i>	89,000	89,500	90,000	89.00
<i>Urophycis viridis</i>	90,000	90,500	91,000	90.00
<i>Urophycis regia</i>	91,000	91,500	92,000	91.00
<i>Urophycis viridis</i>	92,000	92,500	93,000	92.00
<i>Urophycis regia</i>	93,000	93,500	94,000	93.00
<i>Urophycis viridis</i>	94,000	94,500	95,000	94.00
<i>Urophycis regia</i>	95,000	95,500	96,000	95.00
<i>Urophycis viridis</i>	96,000	96,500	97,000	96.00
<i>Urophycis regia</i>	97,000	97,500	98,000	97.00
<i>Urophycis viridis</i>	98,000	98,500	99,000	98.00
<i>Urophycis regia</i>	99,000	99,500	100,000	99.00

NOTE.—The above figures are based on the results of the survey of the fisheries of the Chesapeake Bay, 1900, and are not to be taken as a basis for comparison with the results of the survey of the fisheries of the Chesapeake Bay, 1901, or 1902.



Table 6.--Moisture content of life samples during Run 2

Table 7.--Moisture content of sections in Run 2 at the Luzon Life and Soil Survey Station					
Sample :	Start of run		Before		After
Sample :	arbitrary		arbitrary		arbitrary
Sample :	Average		Average		Average
Sample :	Section		Section		Section
Sample :	Percent	Percent	Percent	Percent	Percent
1-1	22.3	22.3	22.3	22.3	22.3
2-1	20.7	18.6	19.7	21.4	18.7
3-1	21.5	18.3	11.9	26.9	26.7
4-1	22.2	15.3	11.6	24.1	24.7
5-1	17.6	16.4	11.3	10.3	14.9
6-1	21.2	20.4	19.3	31.4	21.4
7-1	20.2	17.4	10.4	21.0	17.4
8-1	11.3	14.7	14.1	13.4	12.1
9-1	13.4	13.6	15.9	17.6	11.3
10-1	19.4	17.9	16.4	21.0	9.3
Average of 10	17.7	17.3	17.3	21.7	21.7
11-1	14.3	14.1	14.2	13.3	12.3
12-1	11.2	14.5	14.1	12.9	9.2
13-1	14.4	14.6	14.1	14.1	13.7
Average of 4	12.7	14.3	14.3	12.8	11.8
14-1	21.2	15.7	14.1	14.1	13.7
Average of 14	18.1	16.6	16.1	22.4	21.5
15-1	13.1	13.1	13.1	13.1	13.1
16-1	13.1	13.1	13.1	13.1	13.1
17-1	13.1	13.1	13.1	13.1	13.1
18-1	13.1	13.1	13.1	13.1	13.1
19-1	13.1	13.1	13.1	13.1	13.1
20-1	13.1	13.1	13.1	13.1	13.1
21-1	13.1	13.1	13.1	13.1	13.1
22-1	13.1	13.1	13.1	13.1	13.1
23-1	13.1	13.1	13.1	13.1	13.1
24-1	13.1	13.1	13.1	13.1	13.1
25-1	13.1	13.1	13.1	13.1	13.1
26-1	13.1	13.1	13.1	13.1	13.1
27-1	13.1	13.1	13.1	13.1	13.1
28-1	13.1	13.1	13.1	13.1	13.1
29-1	13.1	13.1	13.1	13.1	13.1
30-1	13.1	13.1	13.1	13.1	13.1
31-1	13.1	13.1	13.1	13.1	13.1
32-1	13.1	13.1	13.1	13.1	13.1
33-1	13.1	13.1	13.1	13.1	13.1
34-1	13.1	13.1	13.1	13.1	13.1
35-1	13.1	13.1	13.1	13.1	13.1
36-1	13.1	13.1	13.1	13.1	13.1
37-1	13.1	13.1	13.1	13.1	13.1
38-1	13.1	13.1	13.1	13.1	13.1
39-1	13.1	13.1	13.1	13.1	13.1
40-1	13.1	13.1	13.1	13.1	13.1
41-1	13.1	13.1	13.1	13.1	13.1
42-1	13.1	13.1	13.1	13.1	13.1
43-1	13.1	13.1	13.1	13.1	13.1
44-1	13.1	13.1	13.1	13.1	13.1
45-1	13.1	13.1	13.1	13.1	13.1
46-1	13.1	13.1	13.1	13.1	13.1
47-1	13.1	13.1	13.1	13.1	13.1
48-1	13.1	13.1	13.1	13.1	13.1
49-1	13.1	13.1	13.1	13.1	13.1
50-1	13.1	13.1	13.1	13.1	13.1
51-1	13.1	13.1	13.1	13.1	13.1
52-1	13.1	13.1	13.1	13.1	13.1
53-1	13.1	13.1	13.1	13.1	13.1
54-1	13.1	13.1	13.1	13.1	13.1
55-1	13.1	13.1	13.1	13.1	13.1
56-1	13.1	13.1	13.1	13.1	13.1
57-1	13.1	13.1	13.1	13.1	13.1
58-1	13.1	13.1	13.1	13.1	13.1
59-1	13.1	13.1	13.1	13.1	13.1
60-1	13.1	13.1	13.1	13.1	13.1
61-1	13.1	13.1	13.1	13.1	13.1
62-1	13.1	13.1	13.1	13.1	13.1
63-1	13.1	13.1	13.1	13.1	13.1
64-1	13.1	13.1	13.1	13.1	13.1
65-1	13.1	13.1	13.1	13.1	13.1
66-1	13.1	13.1	13.1	13.1	13.1
67-1	13.1	13.1	13.1	13.1	13.1
68-1	13.1	13.1	13.1	13.1	13.1
69-1	13.1	13.1	13.1	13.1	13.1
70-1	13.1	13.1	13.1	13.1	13.1
71-1	13.1	13.1	13.1	13.1	13.1
72-1	13.1	13.1	13.1	13.1	13.1
73-1	13.1	13.1	13.1	13.1	13.1
74-1	13.1	13.1	13.1	13.1	13.1
75-1	13.1	13.1	13.1	13.1	13.1
76-1	13.1	13.1	13.1	13.1	13.1
77-1	13.1	13.1	13.1	13.1	13.1
78-1	13.1	13.1	13.1	13.1	13.1
79-1	13.1	13.1	13.1	13.1	13.1
80-1	13.1	13.1	13.1	13.1	13.1
81-1	13.1	13.1	13.1	13.1	13.1
82-1	13.1	13.1	13.1	13.1	13.1
83-1	13.1	13.1	13.1	13.1	13.1
84-1	13.1	13.1	13.1	13.1	13.1
85-1	13.1	13.1	13.1	13.1	13.1
86-1	13.1	13.1	13.1	13.1	13.1
87-1	13.1	13.1	13.1	13.1	13.1
88-1	13.1	13.1	13.1	13.1	13.1
89-1	13.1	13.1	13.1	13.1	13.1
90-1	13.1	13.1	13.1	13.1	13.1
91-1	13.1	13.1	13.1	13.1	13.1
92-1	13.1	13.1	13.1	13.1	13.1
93-1	13.1	13.1	13.1	13.1	13.1
94-1	13.1	13.1	13.1	13.1	13.1
95-1	13.1	13.1	13.1	13.1	13.1
96-1	13.1	13.1	13.1	13.1	13.1
97-1	13.1	13.1	13.1	13.1	13.1
98-1	13.1	13.1	13.1	13.1	13.1
99-1	13.1	13.1	13.1	13.1	13.1
100-1	13.1	13.1	13.1	13.1	13.1

Based on the basis of 100% moisture content, the data is as follows:





Table 6.--Misture content of silt samples during Run 2

Sample No.	Misture content			
	Start of run	End of Run 2	Before conditioning	After conditioning
	Based on arbitrary initial values	Recalculated values <sup>1</sup>		
	Percent	Percent	Percent	Percent
1-B	28.3	25.4	4.5	10.1
2-B	37.9	47.3	7.1	11.6
3-B	45.4	43.9	5.5	10.8
4-B	53.7	49.2	3.3	7.9
5-B	45.8	42.1	5.4	10.3
6-B	50.3	45.4	5.2	9.5
7-B	30.7	46.4	6.2	11.4
8-B	33.4	32.5	8.8	15.4
9-B	26.2	25.7	4.6	10.1
10-B	52.4	46.1	6.0	11.0
Average of 3 wettest	54.6	47.6	7.4	12.8
Average of all	44.4	40.4	5.7	10.8
11-A	(2)	46.6	7.6	13.0
12-C	(2)	21.6	3.6	9.7
13-A	(2)	20.5	5.0	7.7
14-A	(2)	21.5	6.3	9.0
Average of 2 wettest	(2)	34.2	6.9	11.4
Average of last four	(2)	27.6	5.6	9.9

<sup>1</sup>Recalculated on the basis of immediate moisture content determinations.

<sup>2</sup>No data.

Table 1. - *Continued*

Station	Depth of water		Direction of surface current		Direction of surface current
	Surface	Bottom	Force	Direction	
1.00	0.2	0.25	0.25	0.25	0.25
1.10	0.2	0.25	0.25	0.25	0.25
1.20	0.2	0.25	0.25	0.25	0.25
1.30	0.2	0.25	0.25	0.25	0.25
1.40	0.2	0.25	0.25	0.25	0.25
1.50	0.2	0.25	0.25	0.25	0.25
1.60	0.2	0.25	0.25	0.25	0.25
1.70	0.2	0.25	0.25	0.25	0.25
1.80	0.2	0.25	0.25	0.25	0.25
1.90	0.2	0.25	0.25	0.25	0.25
2.00	0.2	0.25	0.25	0.25	0.25
2.10	0.2	0.25	0.25	0.25	0.25
2.20	0.2	0.25	0.25	0.25	0.25
2.30	0.2	0.25	0.25	0.25	0.25
2.40	0.2	0.25	0.25	0.25	0.25
2.50	0.2	0.25	0.25	0.25	0.25
2.60	0.2	0.25	0.25	0.25	0.25
2.70	0.2	0.25	0.25	0.25	0.25
2.80	0.2	0.25	0.25	0.25	0.25
2.90	0.2	0.25	0.25	0.25	0.25
3.00	0.2	0.25	0.25	0.25	0.25
3.10	0.2	0.25	0.25	0.25	0.25
3.20	0.2	0.25	0.25	0.25	0.25
3.30	0.2	0.25	0.25	0.25	0.25
3.40	0.2	0.25	0.25	0.25	0.25
3.50	0.2	0.25	0.25	0.25	0.25
3.60	0.2	0.25	0.25	0.25	0.25
3.70	0.2	0.25	0.25	0.25	0.25
3.80	0.2	0.25	0.25	0.25	0.25
3.90	0.2	0.25	0.25	0.25	0.25
4.00	0.2	0.25	0.25	0.25	0.25
4.10	0.2	0.25	0.25	0.25	0.25
4.20	0.2	0.25	0.25	0.25	0.25
4.30	0.2	0.25	0.25	0.25	0.25
4.40	0.2	0.25	0.25	0.25	0.25
4.50	0.2	0.25	0.25	0.25	0.25
4.60	0.2	0.25	0.25	0.25	0.25
4.70	0.2	0.25	0.25	0.25	0.25
4.80	0.2	0.25	0.25	0.25	0.25
4.90	0.2	0.25	0.25	0.25	0.25
5.00	0.2	0.25	0.25	0.25	0.25
5.10	0.2	0.25	0.25	0.25	0.25
5.20	0.2	0.25	0.25	0.25	0.25
5.30	0.2	0.25	0.25	0.25	0.25
5.40	0.2	0.25	0.25	0.25	0.25
5.50	0.2	0.25	0.25	0.25	0.25
5.60	0.2	0.25	0.25	0.25	0.25
5.70	0.2	0.25	0.25	0.25	0.25
5.80	0.2	0.25	0.25	0.25	0.25
5.90	0.2	0.25	0.25	0.25	0.25
6.00	0.2	0.25	0.25	0.25	0.25
6.10	0.2	0.25	0.25	0.25	0.25
6.20	0.2	0.25	0.25	0.25	0.25
6.30	0.2	0.25	0.25	0.25	0.25
6.40	0.2	0.25	0.25	0.25	0.25
6.50	0.2	0.25	0.25	0.25	0.25
6.60	0.2	0.25	0.25	0.25	0.25
6.70	0.2	0.25	0.25	0.25	0.25
6.80	0.2	0.25	0.25	0.25	0.25
6.90	0.2	0.25	0.25	0.25	0.25
7.00	0.2	0.25	0.25	0.25	0.25
7.10	0.2	0.25	0.25	0.25	0.25
7.20	0.2	0.25	0.25	0.25	0.25
7.30	0.2	0.25	0.25	0.25	0.25
7.40	0.2	0.25	0.25	0.25	0.25
7.50	0.2	0.25	0.25	0.25	0.25
7.60	0.2	0.25	0.25	0.25	0.25
7.70	0.2	0.25	0.25	0.25	0.25
7.80	0.2	0.25	0.25	0.25	0.25
7.90	0.2	0.25	0.25	0.25	0.25
8.00	0.2	0.25	0.25	0.25	0.25
8.10	0.2	0.25	0.25	0.25	0.25
8.20	0.2	0.25	0.25	0.25	0.25
8.30	0.2	0.25	0.25	0.25	0.25
8.40	0.2	0.25	0.25	0.25	0.25
8.50	0.2	0.25	0.25	0.25	0.25
8.60	0.2	0.25	0.25	0.25	0.25
8.70	0.2	0.25	0.25	0.25	0.25
8.80	0.2	0.25	0.25	0.25	0.25
8.90	0.2	0.25	0.25	0.25	0.25
9.00	0.2	0.25	0.25	0.25	0.25
9.10	0.2	0.25	0.25	0.25	0.25
9.20	0.2	0.25	0.25	0.25	0.25
9.30	0.2	0.25	0.25	0.25	0.25
9.40	0.2	0.25	0.25	0.25	0.25
9.50	0.2	0.25	0.25	0.25	0.25
9.60	0.2	0.25	0.25	0.25	0.25
9.70	0.2	0.25	0.25	0.25	0.25
9.80	0.2	0.25	0.25	0.25	0.25
9.90	0.2	0.25	0.25	0.25	0.25
10.00	0.2	0.25	0.25	0.25	0.25

Direction of surface current is the direction of the surface current as observed from the shore.



Table 7.--Final moisture content and stress test results at end of Run 7

Sample No.	Moisture content			Case-hardening
	Shell	Core	Average	
No.	Percent	Percent	Percent	
1-B	9.4	9.5	9.4	None
2-B	9.1	9.4	9.4	Do.
3-B	9.7	9.9	10.0	Do.
4-B	9.6	9.7	9.8	Do.
11-B 5-B	9.8	9.6	9.7	Do.
13-B	25.4		24.1	
14-B 6-B	9.7	10.0	9.6	Do.
15-B 7-B	9.5	9.9	9.7	Do.
16-B 8-B	9.3	9.6	10.0	Do.
17-B 9-B	9.2	10.0	9.5	Do.
10-B	9.2	9.6	9.6	Do.
Average				
3 wet 11-A	9.5	9.8	9.7	Do.
12-C	8.8	9.9	9.9	Do.
13-A	8.5	9.3	9.8	Do.
14-A	8.7	9.0	9.2	Do.
Average of all	9.4	9.7	9.7	
Wettest	9.8	10.0	10.0	
Driest	8.5	9.0	9.2	





Table 2.--Final moisture content and stress test  
 Table 3.--Comparative initial moisture content  
 of kila samples in Run 3

Sample No.	Moisture content	hardening
No.	Arbitrary values	Recalculated values from Percent of intermediate moisture content
11-B	Percent	8.9
13-B	8.0	8.4
11-B	49.1	49.3
13-B	25.4	24.1
14-B	25.0	24.7
15-B	24.9	26.7
16-B	24.0	24.0
17-B	25.2	25.1
Average of all	8.0	8.7
Average of 3 wettest	33.2	33.7
	7.8	8.2





Table 9.--Final moisture content and stress test results at end of Run 3

Table 10.--Comparison of final moisture content values for all three kiln runs

Sample No.	Moisture content			Case-hardening
	Shell	Core	Average	
	Percent	Percent	Percent	
11-B: ---4---	8.0	8.9	8.8	None
13-B: Average	8.0	8.4	8.1	Range Do.
14-B: ---4---	7.9	8.6	8.2	Do.
15-B: ---4---	7.8	8.7	8.3	Do.
16-B	8.0	10.4	8.8	Do.
17-B	8.4 8.3	8.2 9.1	8.8 9.0	Do. 9.2
1	9.7	9.2	10.0	10.0
Average of all	8.7	8.2	9.1	10.5
all	8.0	8.9	8.7	
All	8.3	8.2	10.0	1.8 10.4
Wettest	8.3	10.4	9.1	
driest	7.8	8.0	8.2	

Table 1.1. Summary of the data for the 1970-1971 season

Year	Number of observations				Total
	1970	1971	1972	1973	
1970	100	100	100	100	400
1971	100	100	100	100	400
1972	100	100	100	100	400
1973	100	100	100	100	400
1974	100	100	100	100	400
1975	100	100	100	100	400
1976	100	100	100	100	400
1977	100	100	100	100	400
1978	100	100	100	100	400
1979	100	100	100	100	400
1980	100	100	100	100	400
1981	100	100	100	100	400
1982	100	100	100	100	400
1983	100	100	100	100	400
1984	100	100	100	100	400
1985	100	100	100	100	400
1986	100	100	100	100	400
1987	100	100	100	100	400
1988	100	100	100	100	400
1989	100	100	100	100	400
1990	100	100	100	100	400
1991	100	100	100	100	400
1992	100	100	100	100	400
1993	100	100	100	100	400
1994	100	100	100	100	400
1995	100	100	100	100	400
1996	100	100	100	100	400
1997	100	100	100	100	400
1998	100	100	100	100	400
1999	100	100	100	100	400
2000	100	100	100	100	400
2001	100	100	100	100	400
2002	100	100	100	100	400
2003	100	100	100	100	400
2004	100	100	100	100	400
2005	100	100	100	100	400
2006	100	100	100	100	400
2007	100	100	100	100	400
2008	100	100	100	100	400
2009	100	100	100	100	400
2010	100	100	100	100	400
2011	100	100	100	100	400
2012	100	100	100	100	400
2013	100	100	100	100	400
2014	100	100	100	100	400
2015	100	100	100	100	400
2016	100	100	100	100	400
2017	100	100	100	100	400
2018	100	100	100	100	400
2019	100	100	100	100	400
2020	100	100	100	100	400
2021	100	100	100	100	400
2022	100	100	100	100	400
2023	100	100	100	100	400
2024	100	100	100	100	400
2025	100	100	100	100	400
2026	100	100	100	100	400
2027	100	100	100	100	400
2028	100	100	100	100	400
2029	100	100	100	100	400
2030	100	100	100	100	400



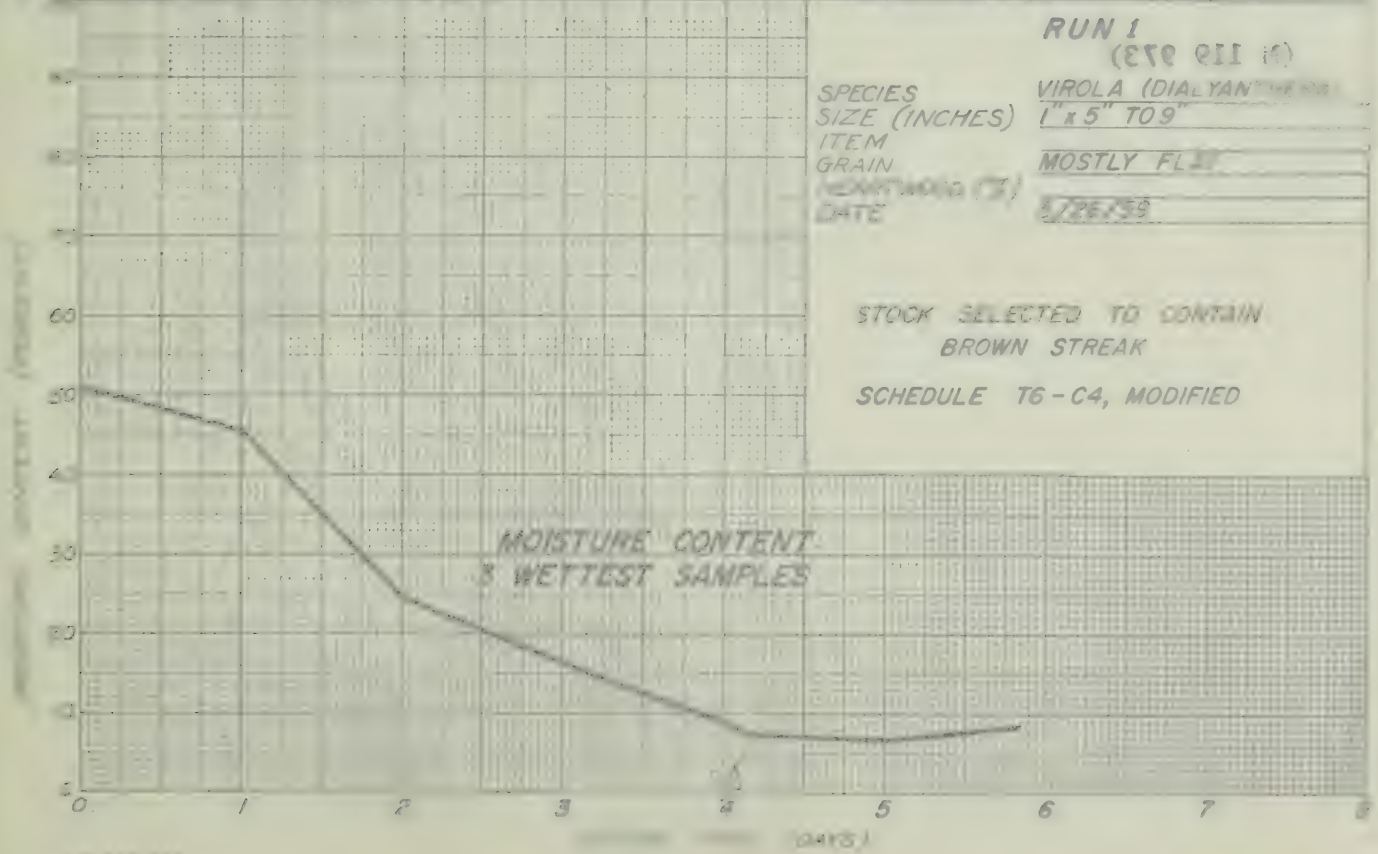
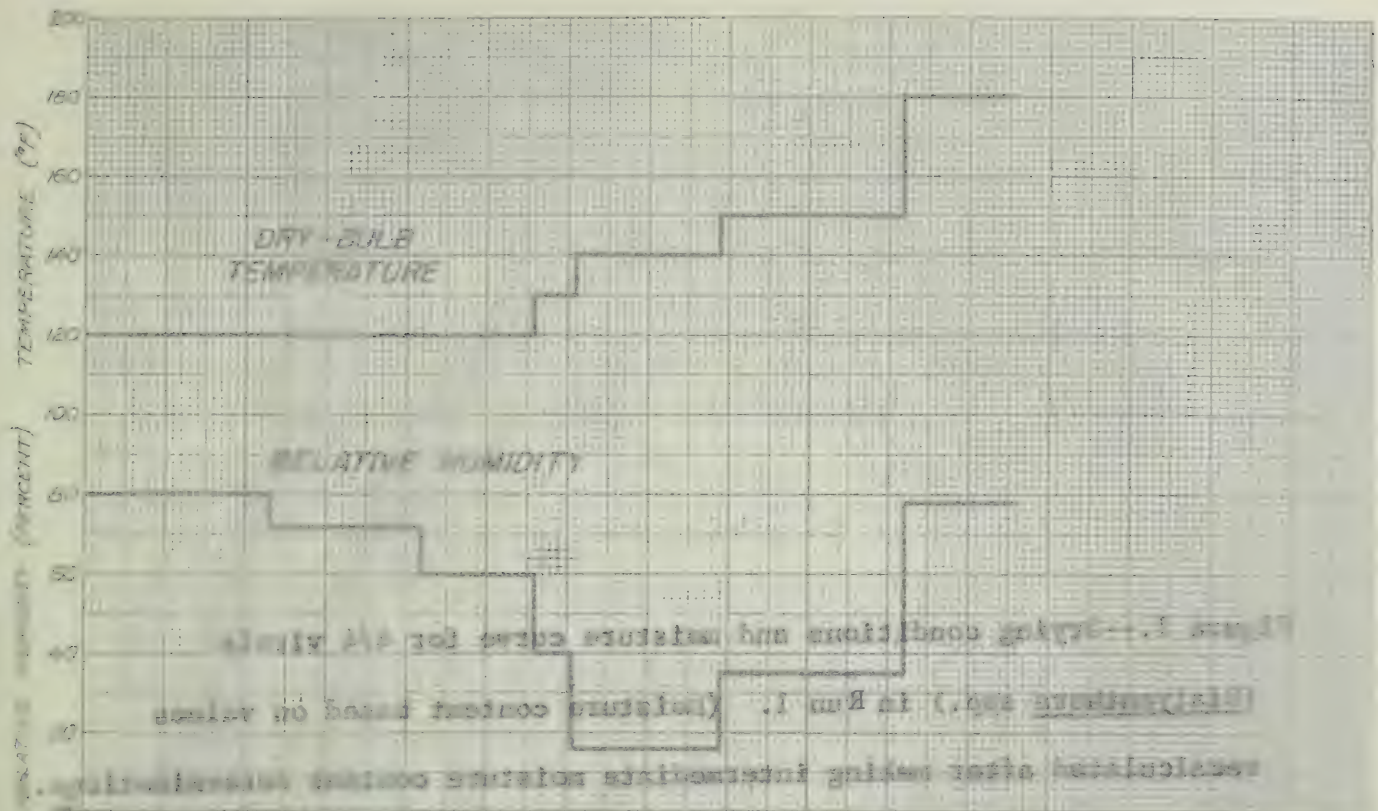
Table 10.--Comparison of final moisture content values  
for all three kila runs

Run No.	Moisture content				
	Average sections				Wettest core
	Average	Minimum	Maximum	Range	
	Percent	Percent	Percent	Percent	Percent
1	8.4	8.2	8.8	0.6	9.2
2	9.7	9.2	10.0	.8	10.0
3	8.7	8.2	9.1	.9	10.4
All	8.9	8.2	10.0	1.8	10.4

MOISTURE CONTENT  
3 POINT SAMPLES

[illegible]





RUN 1  
(370 011 10)

SPECIES VIOLA (DIALYAN)  
SIZE (INCHES) 1" x 5" TO 9"  
ITEM MOSTLY FLAT  
GRAIN  
REMARKS (3)  
DATE 8/26/59

STOCK SELECTED TO CONTAIN  
BROWN STREAK

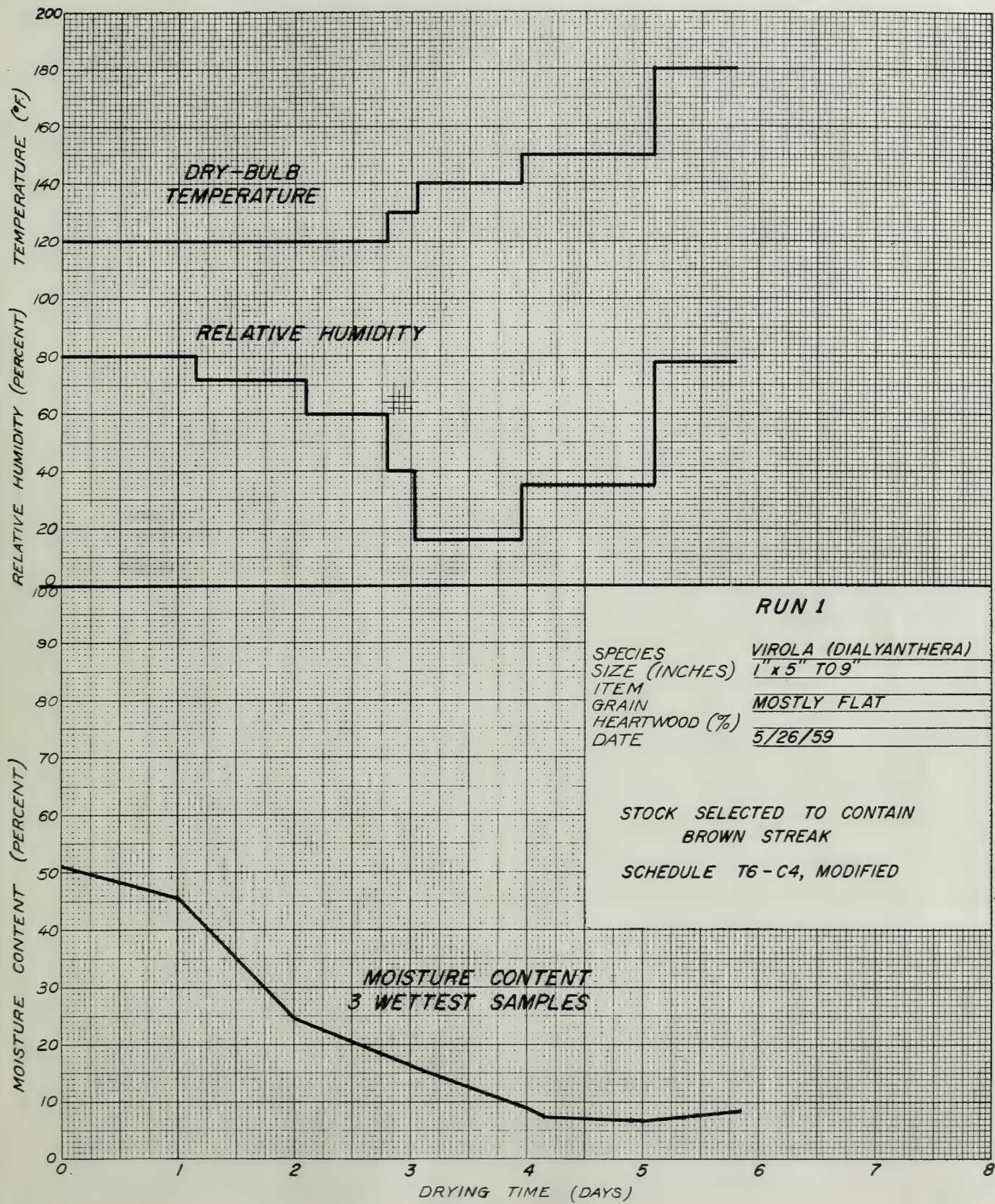
SCHEDULE T6-C4, MODIFIED

Figure 1. Drying conditions and moisture curve for 4/4 viridis

(Dialyanthera spp.) in Run 1. (moisture content based on values  
recalculated after making intermediate moisture content determinations.)

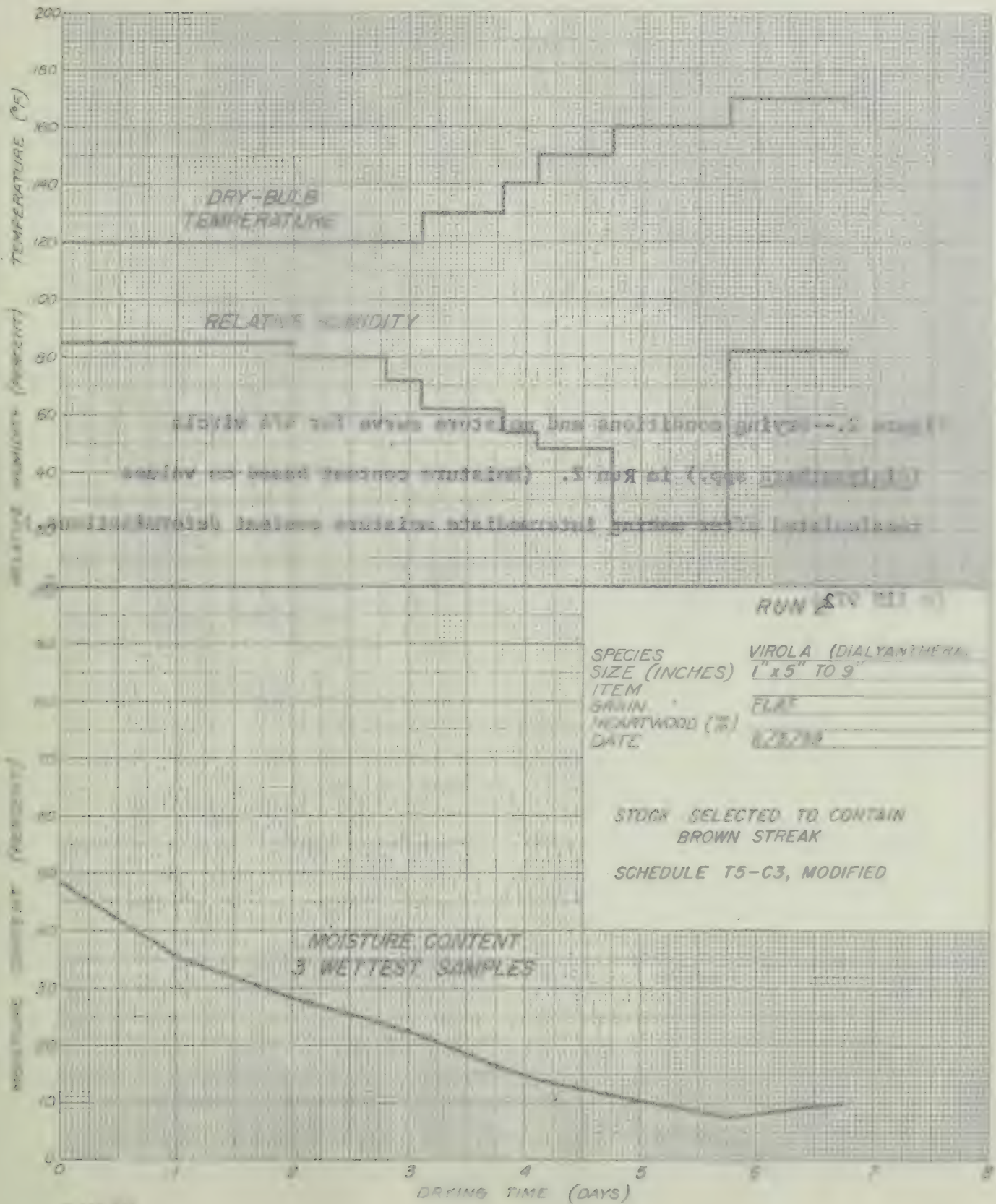
(M 119 973)











RUN 210 111 11

SPECIES VIROLA (DIALYNIHERA)  
 SIZE (INCHES) 1" x 5" TO 9"  
 ITEM FLAT  
 GRAIN HEARTWOOD (%)  
 DATE 6/25/74

STOCK SELECTED TO CONTAIN  
 BROWN STREAK  
 SCHEDULE T5-C3, MODIFIED

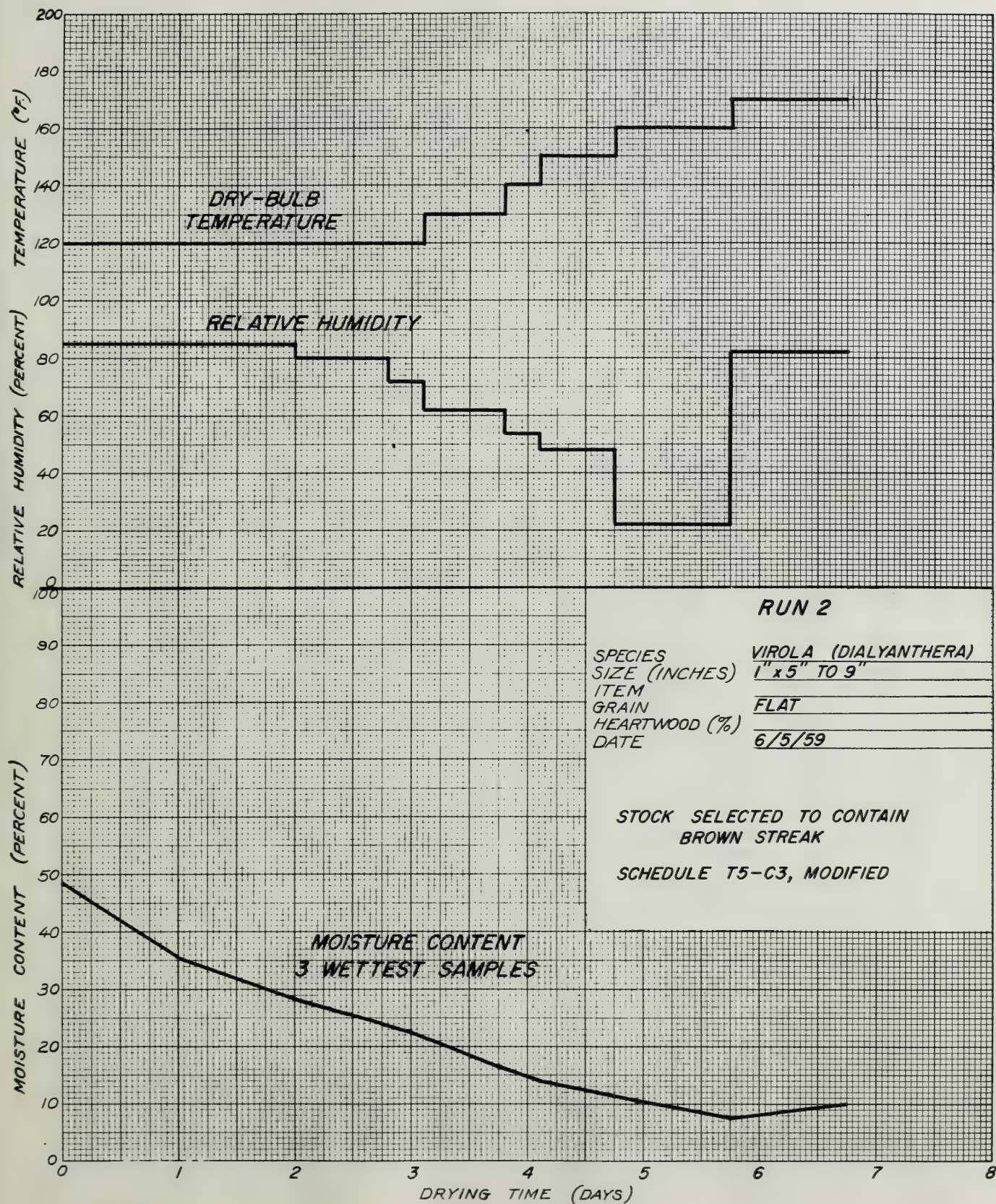
Figure 2.--Drying conditions and moisture curve for 4/4 virgin

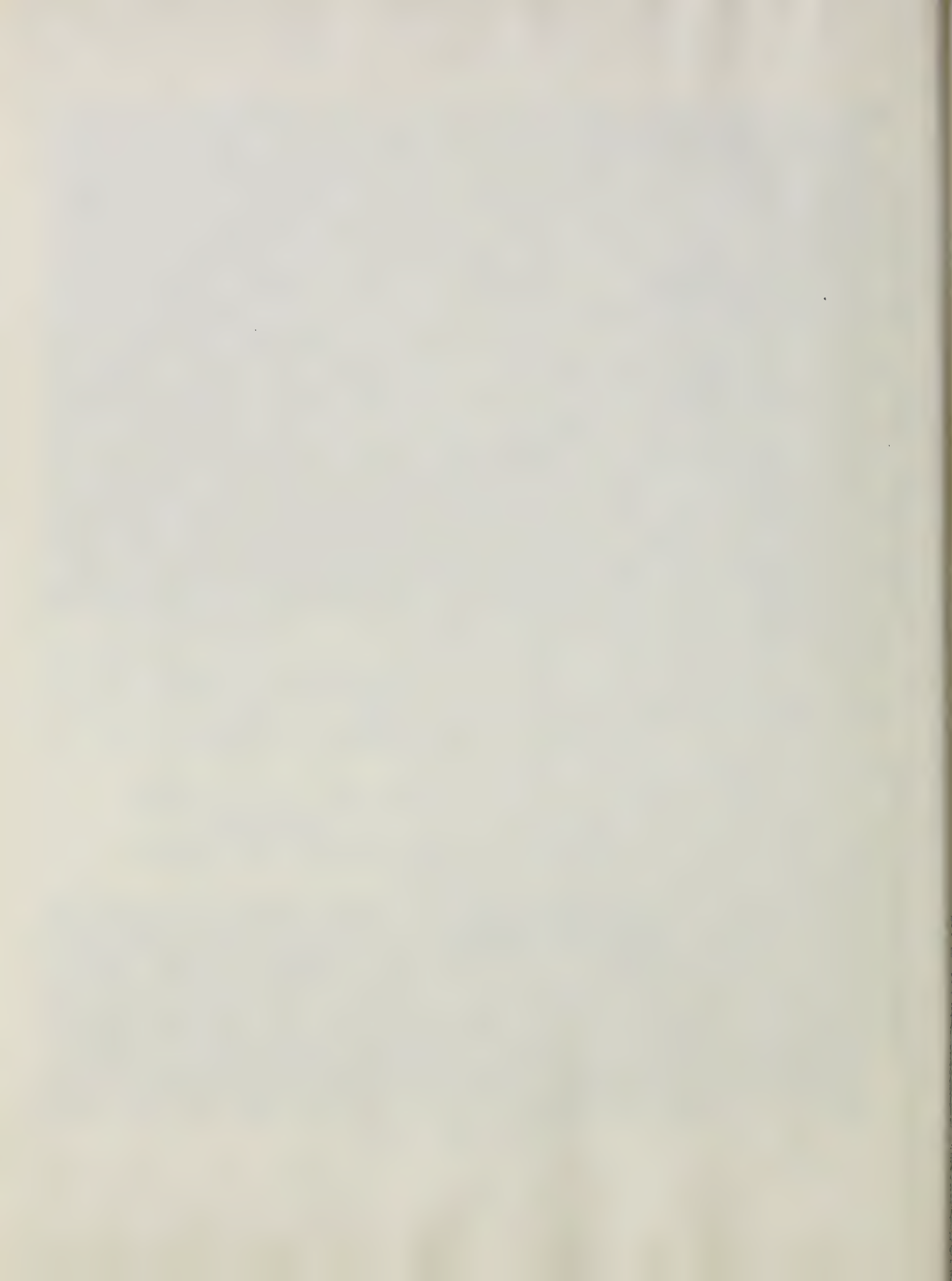
(Albizia spp.) in Run 2. (Moisture content based on values

recalculated after making intermediate moisture content determinations.)

(M 119 972)









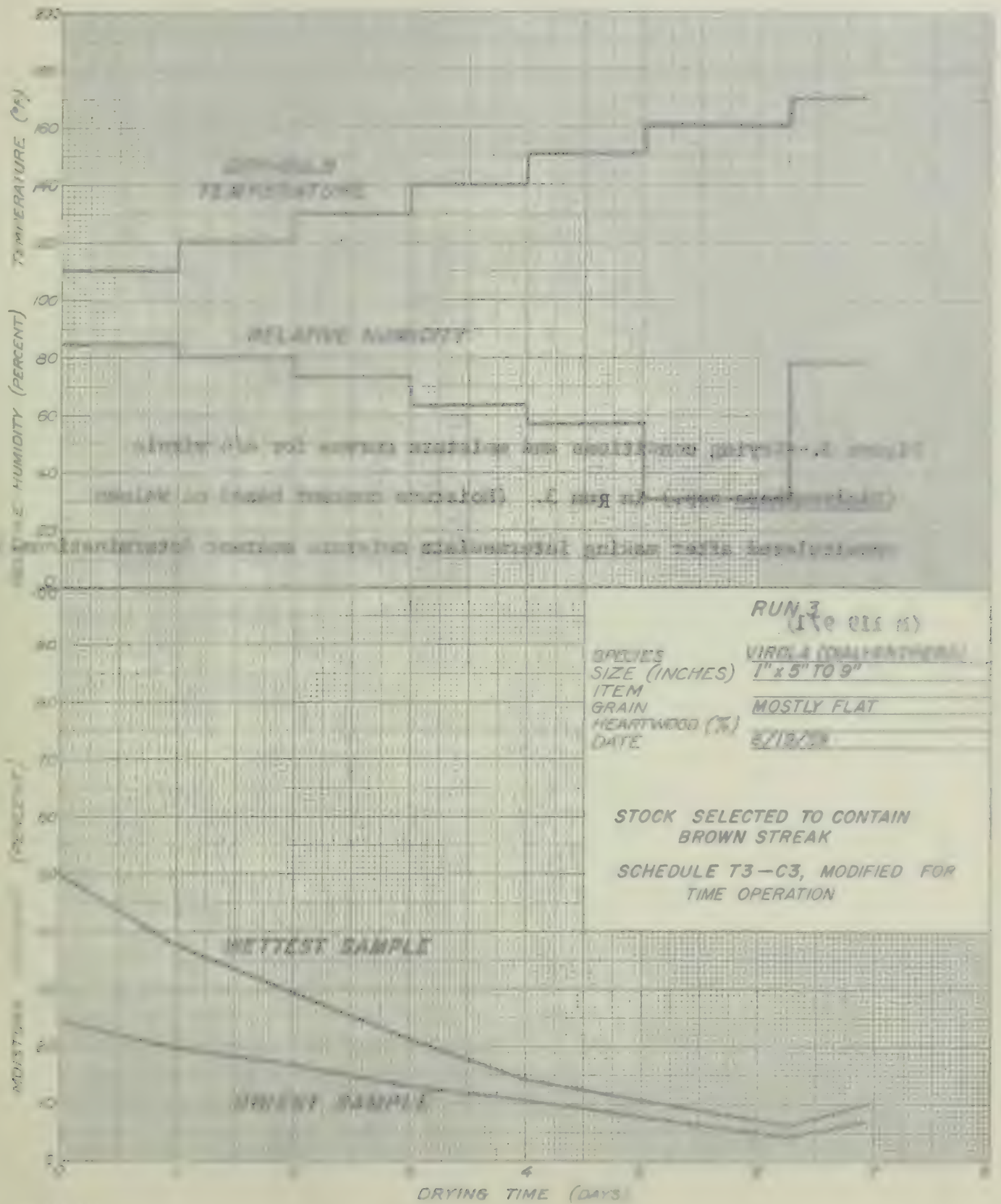


Figure 3.--Drying conditions and moisture curves for 4/4 vitels  
(Dialyzed egg.) in Run 3. (Moisture content based on values  
recalculated after making intermediate moisture content determinations.)

(M 119 971)



